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REPORT

OF THE

SUDAN MEDICAL SERVICE

FOR THE YEAR

1941



REPORT
OF THE
SUDAN MEDICAL SERVICE
FOR THE YEAR
1941

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SUDAN MEDICAL SERVICE.
ANNUAL REPORT 1941.

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ANNUAL REPORT

OF THE SUDAN MEDICAL SERVICE

FOR THE YEAR 1941.

GENERAL HEALTH.

The state of public health in the Sudan was satisfactory throughout the year. The incidence of epidemic disease was below average, but there was a high incidence of cerebrospinal meningitis in western Equatoria Province. Relapsing Fever remained endemic in the Gezira area of Blue Nile Province. Favourable climatic conditions resulted in a low incidence of malaria in the Northern Sudan.

HEALTH OF OFFICIALS.

NATIONALITY.	Number of officials employed	Total		Average days Sickness		Died	Invalided.
		Placed on sick list	No. of days sick	For all officials	For those who were sick		
British	749	303	3,201	4.27	10.56	4	5
Sudanese	5,112	765	7,051	1.37	9.21	7	10
Egyptian	466	104	838	1.79	8.05	2	5

The strain of war and lack of leave to Great Britain had an adverse effect on the health of British Officials.

The comparative figures for the last five years are as follows :—

				1937	1938	1939	1940	1941
British								
Days sickness	...	...	...	1.15	2.22	1.95	3.21	4.27
Died	...	...	...	1	1	1	3	4
Invalided	...	...	...	1	2	4	5	5
Sudanese								
Days sickness	...	...	...	1.58	2.57	1.88	1.95	1.37
Died	...	...	...	6	6	7	5	7
Invalided	...	...	...	11	8	13	20	10
Egyptian								
Days sickness	...	...	...	1.34	1.91	1.73	1.82	1.79
Died	...	...	...	—	1	5	3	2
Invalided	...	...	...	8	3	3	6	5

EPIDEMIC DISEASES.

CEREBROSPINAL MENINGITIS.

1,824 cases were reported with 459 deaths.

The incidence during the last ten years has been as follows:—

YEAR.	Cases.	Deaths.	YEAR.	Cases.	Deaths.
1932	532	384	1937	446	293
1933	166	131	1938	234	124
1934	4,231	3,341	1939	2,714	647
1935	3,249	2,154	1940	4,032	796
1936	13,440	8,906	1941	1,824	459

The distribution in 1941 by provinces was as follows:—

PROVINCE.	Cases.	Deaths.
Blue Nile	45	15
Darfur	139	66
Equatoria	1,317	218
Kassala	10	5
Khartoum	14	2
Kordofan	71	26
Northern	195	119
Upper Nile	33	8

The disease remained prevalent in western Equatoria Province and a small outbreak was reported from the Berber district of Northern Province.

DIPHTHERIA.

186 cases were reported with 38 deaths.

The distribution in 1941 by provinces was as follows:—

PROVINCE.	Cases.	Deaths.	PROVINCE.	Cases.	Deaths.
Blue Nile	38	18	Khartoum	81	13
Darfur	3	1	Kordofan	42	3
Equatoria	—	—	Northern	13	2
Kassala	8	1	Upper Nile	1	—

Incidence during last ten years has been as follows:—

YEAR.	Cases.	YEAR.	Cases.
1932	138	1937	36
1933	51	1938	51
1934	34	1939	77
1935	60	1940	114
1936	63	1941	186

RELAPSING FEVER.

3,028 cases were reported with 110 deaths.

Cases were distributed among provinces in 1941 as follows:—

PROVINCE.	Cases.	Deaths.	PROVINCE.	Cases.	Deaths.
Blue Nile	2,954	103	Khartoum	27	2
Darfur	4	1	Kordofan	29	3
Equatoria	1	—	Northern	3	—
Kassala	9	1	Upper Nile	1	—

Incidence during the last 8 years has been as follows :—

YEAR	Cases.	Deaths.	YEAR.	Cases.	Deaths.
1934	1	—	1938	1,124	116
1935	—	—	1939	1,006	92
1936	22	—	1940	1,487	45
1937	374	48	1941	3,028	110

The incidence was almost entirely confined to the irrigated area of the Gezira and the adjacent districts of Blue Nile Province. Rigorous measures were taken to deal with the disease.

SMALLPOX.

46 cases were reported with no deaths.

Cases were distributed among provinces in 1941 as follows :—

PROVINCE.	Cases.	Deaths.	PROVINCE.	Cases.	Deaths.
Blue Nile	1	—	Khartoum	2	—
Darfur	—	—	Kordofan	—	—
Equatoria	40	—	Northern	1	—
Kassala	—	—	Upper Nile	2	—

The incidence during the last 5 years has been as follows :—

YEAR.	Cases.	Deaths.
1937	425	57
1938	527	158
1939	553	103
1940	515	104
1941	46	—

302,084 vaccinations were carried out in the Sudan during the year.

The extensive vaccination campaigns carried out during the last five years with calf-lymph produced in the Stack Laboratories has resulted in the immunisation of the greater part of the population of the Northern Sudan. A few cases of a very mild strain which exists in the Southern Sudan were reported, but the Sudan remained remarkably free from this disease which might have been expected to increase in incidence during the war.

The number of vaccinations carried out during the last five years has been as follows :—

YEAR.	
1937	561,197
1938	1,348,694
1939	580,052
1940	446,155
1941	302,084

TYPHUS.

For the first time one case of tick typhus was reported in Equatoria Province.

YELLOW FEVER.

No confirmed case was reported during the year.

ENDEMIC DISEASES.

ANCYLOSTOMIASIS.

The incidence and distribution of this disease show no change. It is only of importance in the western part of Equatoria Province.

BILHARZIASIS.

This disease remains low, except in a few areas in the Southern Sudan, and is of little public health importance. It remains however a potential menace to the irrigated area of the Gezira.

BLUE NILE PROVINCE.

The comparative figures for annual surveys and routine examinations of Gezira inhabitants are as follows:—

Schistosoma haematobium.

YEAR.	ADULTS.			CHILDREN.			TOTAL.		
	No. Exmd.	No. Infld.	%	No. Exmd.	No. Infld.	%	No. Exmd.	No. Infld.	%
1926	16,419	76	0.47	—	—	—	16,419	76	0.47
1929	—	—	—	2,341	37	1.60	2,341	37	1.60
1930	—	—	—	3,322	20	0.57	3,322	20	0.57
1931	11,102	84	0.75	6,895	51	0.74	17,997	135	0.75
1932	9,618	51	0.53	1,707	19	1.10	11,325	70	0.62
1933	14,188	28	0.20	3,288	27	0.82	17,476	55	0.31
1934	12,769	5	0.04	3,583	2	0.07	16,352	7	0.04
1935	13,902	8	0.06	2,945	12	0.40	16,847	20	0.12
1936	22,604	10	0.04	5,483	17	0.31	28,087	27	0.09
1937	30,768	26	0.08	10,038	63	0.62	40,806	89	0.22
1938	32,045	50	0.15	16,916	162	0.95	48,961	212	0.43
1939	17,044	30	0.17	10,877	174	1.50	27,921	204	0.73
1940	29,711	64	0.21	12,310	109	0.87	42,021	173	0.41
1941 ...	19,588	17	0.09	14,243	37	0.20	33,831	54	0.16

The figures for the White Nile reservoir area were as follows:—

District	<i>Bilharzia haematobium</i>			<i>Bilharzia mansoni</i> .		
	No. Exmd.	No. Infld.	%	No. Exmd.	No. Infld.	%
Dueim	1,163	50	4.2	2,094	82	3.9
Kosti	1,195	97	8.1	1,255	1	.07

NORTHERN PROVINCE (Dongola and Merowe Districts).

The comparative figures for the last fourteen years from the yearly survey are as follows:—

Year.	Number examined	Infections found.	Percentage	Year.	Number examined	Infections found.	Percentage
1928 ...	12,213	2,259	18.0	1935	40,950	1,408	3.4
1929	17,925	2,187	12.2	1936	37,334	1,268	3.4
1930	26,094	2,443	9.3	1937	46,741	1,155	2.5
1931	37,405	1,765	4.6	1938	44,517	891	2.0
1932	49,077	2,470	5.0	1939	40,194	1,054	2.6
1933	58,711	1,825	3.1	1940	35,205	1,107	3.1
1934	46,054	1,768	3.8	1941 ...	28,982	838	2.9

Wadi Halfa District.

Bilharziasis remains of little importance in this district. The results of the survey organised eight years ago are as follows:—

Year.	Number examined.	Infections found.	Percentage	Year.	Number examined	Infections found.	Percentage
1934 ...	20,180	3,927	19.46	1938	21,958	2,763	12.5
1935	12,076	2,613	21.6	1939	18,319	2,422	13.1
1936	12,437	1,439	12.9	1940	16,064	2,435	15.1
1937	18,498	2,002	10.8	1941 ...	13,590	2,039	15.0

BLACKWATER FEVER.

The incidence of this disease during the last ten years has been as follows:—

YEAR	Cases	Deaths	YEAR	Cases	Deaths
1932	66	23	1937	20	5
1933	38	12	1938	29	8
1934	34	9	1939	20	7
1935	18	9	1940	24	9
1936	38	14	1941	28	9

The nationalities affected were:—

	Cases	Deaths
Sudanese (Arab)	17	7
Sudanese (Negroid)	1	—
Abyssinians	1	—
Greek	1	—
European	—	—
Others	8	2

The following table shows the incidence by age and sex in the various areas:—

PROVINCE	DISTRICT	MALE		FEMALE		AGE GROUPS.							
		A	D	A	D	0-1	1-5	5-15	15-25	25-35	35-45	45-65	Age Un-known
Blue Nile	W. Nile Fung	1	1	—	—	—	—	—	—	—	1	—	—
		2	1	—	—	—	2	—	—	—	—	—	—
Equatoria	Central District	6	2	1	—	—	—	—	2	3	2	—	—
	Wau	2	—	—	—	—	—	—	—	1	1	—	—
	S. Yubu	—	—	1	—	—	—	—	—	1	—	—	—
	Meridi	2	—	—	—	—	—	—	1	—	—	1	—
	Torit	2	1	—	—	—	—	—	1	—	1	—	—
Khartoum	Khartoum	1	—	—	—	—	—	—	—	—	1	—	—
	Omdurman	2	1	—	—	—	—	—	—	—	1	1	—
	Khtm. N.	1	—	—	—	—	—	—	—	—	—	—	1
Kordofan	Kadugli Talodi	1	1	—	—	—	—	1	—	—	—	—	—
		2	1	—	—	—	—	1	1	—	—	—	—
Northern		1	—	—	—	—	—	—	—	—	1	—	—
Upper Nile		3	1	—	—	—	—	—	1	1	—	1	—
TOTAL		26	—	2	—	—	2	2	6	6	8	3	1
DEATHS			9	—	—	—	1	2	1	2	2	1	—

DRACONTIASIS.

This disease remains prevalent in Equatoria Province, the Nuba Mountains and the Bor district of Upper Nile Province. Anti-guinea worm wells have recently been constructed in many endemic areas and it is hoped that there will be a reduction in incidence as a result.

DYSENTERY.

3,661 cases were admitted to hospital of which 2,924 were diagnosed as amoebic and 737 as bacillary dysentery.

The following table shows the admissions to hospital given as the percentage of the total admissions from all causes for the last nine years:—

	1933	1934	1935	1936	1937	1938	1939	1940	1941
Amoebic Dysentery	3.25	3.00	2.83	2.49	2.48	2.76	3.18	2.88	2.84
Bacillary Dysentery	0.38	0.28	0.26	0.18	0.13	0.13	0.17	0.26	0.72
TOTAL	3.63	3.28	3.09	2.67	2.61	2.89	3.35	3.14	3.56

War activities have increased the incidence of bacillary dysentery..

ENTERIC FEVER.

The incidence of this disease during the last ten years has been as follows:—

1932	85	1937	165
1933	204	1938	213
1934	188	1939	202
1935	246	1940	336
1936	135	1941	129

LEISHMANIASIS.

The incidence during the last ten years has been as follows:—

YEAR.	Cases.	YEAR.	Cases.
1932	103	1937	336
1933	202	1938	295
1934	289	1939	394
1935	171	1940	460
1936	214	1941	494

235 infected cases 28 deaths

Kala-Azar.

477 cases were reported with 138 deaths. The distribution of this disease remains the same and the endemic area along the whole length of the Abyssinian Frontier provides nearly all the cases. Many of the cases were due to the fact that the recent campaign took place in the worst endemic centres of the Sudan, along the Eritrean and Abyssinian Frontiers. Treatment of this disease by 4'4 Diamidino—Stilbene is still under investigation. It appears that the Sudan variety of Kala-Azar has a high mortality despite any form of treatment.

UPPER NILE PROVINCE.

There has been an increase in incidence and the disease has spread to the west bank of the White Nile. There have been certain new factors which may have resulted in cases being reported more readily.

DISTRIBUTION.

Province.	District.	MALE		FEMALE		A G E G R O U P S							
		A	D	A	D	0-1	1-5	5-15	15-25	25-35	35-45	45-65	Over 65
Blue Nile	Gezira	24	8	1	—	—	1	2	17	3	1	—	1
	W. Nile	2	—	—	—	—	—	—	2	—	—	—	—
	Sennar	27	7	2	—	—	1	2	12	10	4	—	—
	S. Fung	28	14	7	4	—	—	14	12	8	1	—	—
	Singa	119	28	24	11	—	9	50	32	29	14	8	1
Darfur	El Fasher	12	1	5	—	—	2	11	4	—	—	—	—
	Nyala	6	—	1	—	—	—	3	1	1	2	—	—
Equatoria	Central District	4	1	—	—	—	—	—	1	3	—	—	—
	S. Yubu	1	—	—	—	—	—	—	1	—	—	—	—
	East., District	13	1	3	1	—	1	10	2	3	—	—	—
Kassala	Kassala	9	6	—	—	—	—	1	3	5	—	—	—
	Gedaref	65	18	8	1	—	2	14	21	28	5	2	1
	P. Sudan	4	—	—	—	—	—	—	3	1	—	—	—
Khartoum	Khartoum	8	2	—	—	—	—	3	2	3	—	—	—
	Omdurman	2	2	—	—	—	—	—	1	1	—	—	—
Kordofan	El Obeid	2	1	—	—	—	—	—	1	1	—	—	—
	Nuba Mtn.	43	9	11	—	1	11	13	16	9	2	2	—
Northern	Atbara	3	3	—	—	—	—	1	1	—	1	—	—
	Halfa	3	1	—	—	—	—	1	2	—	—	—	—
Upper Nile		44	20	13	4	—	1	12	23	19	2	—	—
TOTAL		419		75		1	28	137	157	124	32	12	3
DEATHS			122		21	—	6	29	54	39	10	4	1

RACE.

The races affected were:—

Sudanese (Arab)	....	....	....	257	Egyptians	...	....	....	....	3
Sudanese (Negroid)	....	....	....	153	Eritreans	...	....	....	....	1
West Africans	....	....	....	62	British	...	....	....	....	1
Abyssinians	....	....	....	17						

RESULTS OF TREATMENT.

	Apparently cured		Died.	Still under		Untreated or lost
	%		%	treatment %		sight of %.
1937	37	17	28	18	
1938	35.6	18.3	18.7	27.4	
1939	42.1	26.4	21.1	10.4	
1940	58.7	18.0	12.2	11.1	
1941	47.4	28.9	11.1	12.6	

ESPUNDIA.

1 case was reported during the year from Blue Nile Province.

CUTANEOUS LEISHMANIASIS.

46 cases were reported of which 38 were from Kordofan Province, and 8 from Darfur Province. There was a large increase in incidence in the Nuba Mountains where the disease is probably commoner than records show.

LEPROSY.

The following table shows the distribution of lepers in the Sudan :—

Province	Under treatment in camps or settlements.	Under observation and treatment as hospital or dispensary outpatients.	Total under treatment.	Under observation but not under treatment.	Total cases.
Blue Nile	54	43	97	74	171
Darfur	36	—	36	—	36
Equatoria	1,541	48	1,589	2,603	4,192
Kassala	32	1	33	—	33
Khartoum	4	—	4	—	4
Kordofan	104	21	125	1,937	2,062
Northern	48	3	51	1	52
Upper Nile	30	2	32	—	32
TOTAL	1,849	118	1,967	4,615	6,582

There is no sign of any increase in the incidence of this disease in any part of the Sudan, but progress in eliminating it must be very slow depending to a large degree on education of the people and raising of the general standard of living.

The large settlement at Li Rangu in Equatoria Province now contains 1,053 lepers of whom 200 are segregated. The policy in recent years has been to reduce the size of this settlement and decentralise the work as much as possible.

MALARIA.

8,551 cases were admitted to hospital with 60 deaths. The incidence remained low in the Northern Sudan due to favourable climatic conditions.

BLUE NILE PROVINCE.

The situation in regard to malaria has been favourable. The incidence in the Gezira Area shows a small rise over 1940 but 1940 was also an exceptionally good year.

GEZIRA AREA.	1940		1941	
	Cases.	Deaths	Cases	Deaths
Hospital inpatients	620	5	759	3
Hospital outpatients	821	—	1,046	—
Dispensary outpatients	14,009	—	16,090	—

Malignant tertian malaria is the prevailing infection and the figures of the various types found on microscopic examination were as follows :—

Malignant Tertian	Benign Tertian	Quartan
538	274	36

WHITE NILE RESERVOIR.

In this area the incidence has decreased during the past four years. This is an important fact as it might have been expected that the filling of the Jebel Aulia reservoir, which was gradually effected during this period, would cause conditions favourable to the spread of malaria. A large anti-malarial organisation has been created in this area.

Number of cases of malaria in the last four years are as follows :—

1938	...	...	24,228	1940	...	...	14,068
1939	...	...	16,704	1941	...	...	10,336

The undermentioned surveys were carried out in villages earmarked for resiting owing to adverse conditions caused by the reservoir of the Jebel Aulia Dam :—

Village	No. Examined for Spleen	Splenic Enlargement.	%	B.F. Examined	B.F. Positive	%
Abu Hindi	144	132	91	80	50	62
Mohdamed Dioma ...	30	21	70	15	7	43
Kunuz	82	53	65	117	69	58
Hassan Aluba	75	51	68	48	29	60
Hillat Fallata	—	—	—	146	191	77

NORTHERN PROVINCE.

The incidence of malaria was low except for a small outbreak at Debeira in Wadi Halfa District.

GENERAL.

The following table shows the spleen rate of children examined in the intermediate and village schools during the last four years :—

% Spleen Rate				PROVINCE AND DISTRICT	TYPE OF PARASITE 1941		
1938	1939	1940	1941		% Benign	% Malignant	% Quartan
25.9	26.7	14.8	13.5	BLUE NILE PROVINCE ...			
44.7	32.5	17.7	20.0	Gezira Area	32.1	63.5	4.4
50.3	46.4	35.8	41.4	White Nile	40.9	57.9	1.2
				Fung	15.8	83.5	0.7
50.1	45.2	36.4	38.4	DARFUR PROVINCE ...	25.0	73.1	1.9
22.6	28.0	23.6	34.4	EQUATORIA PROVINCE ...	13.6	85.9	0.5
				KASSALA PROVINCE ...			
8.5	9.6	0.9	—	Port Sudan	44.3	54.7	1.0
22.7	19.5	47.2	18.4	Kassala	12.2	87.5	0.3
2.5	6.6	3.5	1.5	KHARTOUM PROVINCE ...	14.3	79.5	6.2
44.1	37.9	32.7	32.2	KORDOFAN PROVINCE ...	26.6	71.4	2.0
10.9	9.9	10.0	7.0	NORTHERN PROVINCE ...	36.3	61.2	0.8
32.1	32.3	20.8	21.2	UPPER NILE PROVINCE ...	5.9	93.3	0.8

RABIES.

The number of persons receiving treatment during the past ten years has been as follows :—

YEAR.				Number of persons receiving treatment.	Deaths despite treatment.	Total. deaths.
1932	....	....	....	226	4	8
1933	....	....	....	75	6	12
1934	....	....	....	198	6	8
1935	....	....	....	290	4	10
1936	....	....	....	373	1	8
1937	....	....	....	534	6	11
1938	....	....	....	557	1	8
1939	....	....	....	422	8	16
1940	....	....	....	352	1	3
1941	...	...	...	407	7	14

All those treated had been actually bitten.

The biting animals were as follows :—

Dogs	Donkeys	Camels
405	1	1

The following data are available as regards the fatal cases :—

Locality.	Age.	Sex.	Biting Animal.	Site of Bite.	Severity of Bite.	No. of days after bite when treatment was begun.	No. of Injec- tions given.	No. of days from bite to fatal termina- tion.
(a) THOSE TREATED								
BLUE NILE Dueim	60	Female	Dog	Scalp	3 inch. severe	40	1	40
DARFUR Kedada	5	Female	Dog	Neck	Superficial	2	14	20
Fasher	35	Male	"	Finger	Deep	23	2	25
Fasher	15	Male	"	both hands	Moderate	7	14	5½ months
KORDOFAN Muglad	14	Male	Dog	Face	3 inch. severe	10	7	17
EQUATORIA Aweil	36	Male	Dog	L. Foot	Deep	2	14	52
Meridi	29	Male	"	Leg	"	60	1	62
(b) THOSE NOT TREATED								
BLUE NILE Jarrasa	10	Male	Dog	Leg	Moderate	—	—	26
DARFUR Geneina	40	Female	Dog	R. Hand	Superficial	—	—	7 months
KORDOFAN Kadugli	25	Female	Dog	R. Arm	Single and Superficial	—	—	60
Obeid	6	Female	"	R. Arm	Severe	—	—	46
Bara	35	Female	"	R. Leg	"	—	—	124
UPPER NILE Malakal	40	Female	Dog	L. Wrist	Moderate	—	—	Died same day of Adm.
Kodok	7	Male	"	R. Leg	Severe	—	—	4

ACUTE RHEUMATISM.

The incidence in the last five years has been as follows :—

YEAR	Cases	Deaths
1937	274	2
1938	292	4
1939	303	4
1940	223	3
1941	356	1

The distribution of cases in 1941 was as follows :—

PROVINCE.	Cases.	Deaths.	PROVINCE.	Cases.	Deaths.
Gezira	21	—	Khartoum	68	—
Darfur	64	—	Kordofan	18	—
Equatoria	62	—	Northern	42	—
Kassala	75	1	Upper Nile	6	—

SCURVY.

71 cases were reported with 5 deaths.

SLEEPING SICKNESS.

125 cases were reported in Equatoria Province compared with 81 in 1940. Of these 77 occurred in the Eastern part of Zande district, 47 in a fresh outbreak in the Meridi district, and 1 in Kajo Kaji sub-district.

The incidence during the last ten years has been as follows :—

YEAR.	Yubu	Yambio.	Yei.	Kajo-Kaji.	Meridi	Imported.
1932	49	14	—	—	—	—
1933	70	12	1	—	—	—
1934	20	2	4	6	—	—
1935	80	—	1	10	—	—
1936	142	—	—	8	—	—
1937	63	1	2	23	—	—
1938	106	—	—	4	—	—
1939	103	—	—	6	—	—
1940	80	—	—	—	—	1
1941	69	—	—	1	47	8

443, 659 palpations were carried out during the year and 4,429 gland punctures were performed.

Zande District.

Sleeping Sickness work and Tsetse Fly control have been carried out on the same lines as in previous years. 77 cases were reported, of which 8 were imported, 7 from French Equatorial Africa and 1 from the Belgian Congo. A pass system has been organised between the Sudan and the Belgian Congo and the Sudan and French Equatorial Africa to enable the people to visit their relatives. The system of fly catching between block clearings was continued but must still be considered in the experimental stage.

Treatment.

Senior Medical Inspector, Source Yubu reports as follows :—

Progress of new cases.

(a) First stage cases.

12 first stage cases were treated with Bayer 205 in outside dispensaries, and 27 were treated with Antrypol in hospital at Yubu.

One of the hospital cases passed into the second stage.

There were two deaths both due to diarrhoea.

(b) Second stage cases.

There were 38 cases and all these were admitted and treated at Sources Yubu hospital.

23 of these cases improved and were discharged to be kept under observation outside, for the next two years.

No case passed into the third stage.

Two cases were intolerant to Tryparsamide and continued their treatment with Sodium Orsonine. Their symptoms of intolerance were impairment of vision due to optic neuritis, stomatitis and skin rashes.

13 cases are still under treatment.

Progress of old cases.

	1941	1940	1939	1938	Before 1938
No Re-admitted	6	6	3	10	15
Treatment given-Tryp. or Sod. Orsonine	6	6	3	10	15
Intolerance Tryp. Arsamide ...	1	1	—	—	1
Improved	1	1	2	7	13
Worse	—	—	1	3	2
Under treatment	5	—	1	3	2
Total under observation ...	179	183	103	105	70
Discharged cured	79	61	—	86	45
Deaths	13	16	8	14	2
Deserted	6	5	3	5	5

Total number of cases remaining under observation on 31.12.41 is 100."

Meridi District.

An outbreak of sleeping sickness was discovered in February in the Meridi district during the course of a routine inspection. This is the first epidemic of Sleeping Sickness which has occurred in this area. By the end of the year 47 cases had been discovered, all from one small area around the River Eidie. The epidemic was localised but severe, and the origin of the infection is unknown. Moving the people, tsetse fly control, and three-monthly inspections were the methods used in controlling this epidemic.

Yei District.

A case was detected on the Kala River in Kajo Kaji sub-district where there was an outbreak some years ago. The usual methods of control are being carried out in this area.

VENEREAL DISEASES.

The incidence of these diseases show no obvious change. It is to be feared that gonorrhoea will become common in certain areas where it was rarely found before the war as the result of the return of troops from heavily infected areas.

TUBERCULOSIS.

1,142 cases were admitted to hospital of whom 631 were pulmonary and 511 non-pulmonary.

The Northern Province still provides many cases, but tuberculosis occurs in all parts of the Sudan. The effect of war conditions on the incidence of this disease will require careful observation. Contacts are regularly examined in Khartoum. The disease appears to be very common in Eritrea and western Ethiopia, which now have more contact with the Sudan than before the war. 36 of the pulmonary cases were foreigners and 7 were Sudanese who contracted the disease in Egypt.

Nationality				Pul.	Non-Pul.	Nationality				Pul.	Non-Pul.
Egyptian	...	...	...	2	1	Hedjazian	...	...	...	1	1
Eritrean	...	...	...	6	6	West African	...	...	...	16	13
Abyssinian	...	...	...	2	4	Syrian	...	...	...	1	—
Yemenie	...	...	...	1	2	British	...	...	...	2	—
Somali	...	...	...	1	1	French	...	...	...	1	—
Indian	...	...	...	1	1	South African	...	...	...	2	1

The following table shows the admissions and percentage rate of tuberculosis to other admissions for the Northern and Southern Sudan for the last six years.

	1936		1937		1938		1939		1940		1941	
	Pul.	Non-Pul.	Pul.	Non-Pul.	Pul.	Non-Pul.	Pul.	Non-Pul.	Pul.	Non-Pul.	Pul.	Non-Pul.
NORTHERN SUDAN Admissions for T.B.	451	313	418	331	550	336	563	333	480	410	505	452
Total Admissions	65,392		66,881		67,622		66,961		68,925		69,441	
Percentage T.B. to total admissions	0.69	0.47	0.62	0.49	0.81	0.49	0.84	0.49	0.69	0.59	0.73	0.65
..	1.16		1.11		1.30		1.33		1.28		1.38	
SOUTHERN SUDAN Admissions for T.B.	68	36	70	64	73	68	122	63	99	47	126	59
Total Admissions	30,689		34,207		36,744		38,142		35,497		33,582	
Percentage T.B. to total admissions	0.22	0.11	0.20	0.19	0.20	0.18	0.32	0.16	0.28	0.13	0.38	0.18
..	0.33		0.39		0.38		0.48		0.41		0.56	

The following table shows the admission for pulmonary and non-pulmonary tuberculosis in the last ten years and the percentage rate of tuberculosis to other admissions :—

YEAR.	Pulmonary		Non-Pulmonary		Total	
	Admissions	Percentage	Admissions	Percentage	Admissions	Percentage
1932	421	0.70	281	0.47	702	1.17
1933	521	0.74	394	0.56	915	1.30
1934	557	0.65	437	0.50	994	1.15
1935	501	0.56	371	0.42	872	0.98
1936	519	0.54	349	0.36	868	0.90
1937	488	0.48	395	0.39	883	0.87
1938	623	0.59	404	0.39	1,027	0.98
1939	685	0.64	396	0.38	1,081	1.02
1940	579	0.55	457	0.44	1,036	0.99
1941	631	0.61	511	0.50	1,142	1.11

AGE INCIDENCE.

The following table shows the incidence of cases and deaths by age from pulmonary tuberculosis :—

AGE PERIODS.	0-1		1-5		5-15		15-25		25-35		35-45		45-65		65 and over		Total	
	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D
Northern Sudan	—	—	5	—	25	7	127	15	167	19	112	24	56	17	13	2	505	84
Southern Sudan	—	—	—	—	11	2	13	1	55	10	27	7	20	6	—	—	126	26

PULMONARY TUBERCULOSIS.

Comparative table showing the occupations of persons affected with Pulmonary Tuberculosis in the Northern Sudan during the last 7 years :—

	Cultivators.	Nomads.	Soldiers, Sailors and Police.	Day Labourers.	Townsmen			Indigent and un-employed.	Women not employed	Children.	TOTAL.
					Artisans & Shop-Keepers.	Clerical.	Servants.				
1935	113	15	9	43	94	—	—	51	87	3	415
1936	104	8	14	53	99	—	—	73	96	4	451
1937	117	5	19	73	47	26	12	72	107	10	488
1938	135	—	17	97	61	19	18	86	115	2	550
1939	164	—	13	72	46	11	28	111	108	10	563
1940	132	—	15	62	25	14	15	107	100	10	480
1941 ...	181	10	32	92	28	16	11	80	141	40	631

NON-PULMONARY TUBERCULOSIS.

Admissions for non-pulmonary tuberculosis were classified as follows :—

	Gland.	Bone	Joint	Other	TOTAL
Northern Sudan	161	98	67	47	373
Southern Sudan	48	42	26	22	138

Age groups were as follows :—

	0-1	1-5	5-15	15-25	25-35	35-45	45-65	65 & over
Northern Sudan	2	18	75	107	120	74	48	9
Southern Sudan	4	7	5	3	30	7	2	—

TUMOURS.

580 cases were admitted, classified as follows :—

Malignant	{	Carcinoma ....	....	....	166				
		Sarcoma ....	....	....	43				
		Unclassified ....	....	....	46			255	
Benign								325	
								580	

The following are the comparative figures for the Northern and Southern, Sudan, shown as a percentage of total admissions, for the last five years :—

	1937		1938		1939		1940		1941	
	Malig- nant.	Non- Malig- nant.	Malig- nant.	Non- Malig- nant.	Malig- nant.	Non- Malig- nant.	Malig- nant.	Non- Malig- nant.	Malig- nant.	Non- Malig- nant.
NORTHERN SUDAN.										
Admissions for new growths	161	407	166	321	219	411	205	259	221	264
Total Admissions	66,881		67,662		66,961		68,925		69,441	
% of Total Admissions	0.24	0.60	0.24	0.47	0.33	0.61	0.29	0.37	0.32	0.38
SOUTHERN SUDAN.										
Admissions for new growths	16	164	30	124	17	82	15	66	34	61
Total Admissions	34,207		36,744		38,142		35,497		33,582	
% of Total Admissions	0.04	0.45	0.08	0.34	0.04	0.21	0.04	0.18	0.1	0.18

UNDULANT FEVER.

31 cases with 3 deaths were reported. The incidence during the last 10 years has been as follows :—

Year.	Cases.	Year	Cases.
1932	26	1937	33
1933	25	1938	28
1934	51	1939	29
1935	28	1940	43
1936	58	1941	31

PUBLIC HEALTH AND HYGIENE.

(BY LT.-COL. H. A. CROUCH, O.B.E., M.C.)

GENERAL REMARKS.

Rains were poor throughout the 1940/41 crop year and the hopes of a normal grain harvest were disappointed. The general food situation was however assisted by the considerable stocks carried over from the previous season and there was no serious lack of essential commodities.

Large demands were made for labour for war purposes, money was plentiful and there was little unemployment.

The state of the public health was satisfactory throughout the year. In spite of the concentration and movement of large numbers of men within the Sudan and the increased communication with neighbouring territories, the incidence of epidemic disease was below average. There was, however, a high incidence of cerebrospinal meningitis in the western districts of Equatoria Province and scattered outbreaks of relapsing fever in the Gezira area of the Blue Nile Province.

There has been little change in the incidence of endemic disease. In some provinces there has been an increase in the incidence of gonorrhea, probably associated with troop movements. As a result of favourable climatic conditions for the third year in succession, the incidence of malaria has been below average.

In spite of the increased activities and demands on staff, steady progress has been maintained in general sanitary improvement and anti-malarial work. The evacuation of Kassala by the enemy provided a suitable opportunity for reorganizing and extending the Public Health Service of the town. Conservancy and refuse disposal systems were augmented and water supplies improved.

With additional mosquito staff enlisted for Aedes control, it was possible also to extend and intensify anti-malarial work in several areas. This resulted in a gratifying fall in the number of anopheline infections found, particularly in Darfur Province. Special attention has again been paid to the spraying of premises during the malarial season.

Shortage of water and increased demands gave rise to anxiety in some areas. In Fasher, the natural reservoir had received very little water during the rains of 1940 and the water table was found to be steadily falling. Additional bores helped to keep the supply going and an alternative supply for watering animals was provided in the neighbourhood. The prospects for 1942 are better as the reservoir was well filled during the current year. At El Obeid, it was observed that the water table had fallen 25 metres in the last 25 years. To guard against the risk of an acute shortage and to meet increased demands plans were approved for the construction of a reservoir to hold at least 50,000 cubic metres of water. This supply is to be filtered and chlorinated before passing to the piped supply service. At Port Sudan, greatly increased demands in the summer months necessitated the institution of rationing and the provisions of a reserve supply. Additional wells were sunk at the source and extra storage provided. Elsewhere in the Sudan piped supplies were adequate and of a satisfactory standard of potability.

STAFF.

Public Health Staff has had a difficult and trying year, due to the many and often sudden demands made on its services. Military establishments, labour concentrations and control of aircraft have taxed resources to the full in personnel and equipment.

The establishment of British Public Health Inspectors was further reduced from 12 to 10. Three Sudanese Public Health Officers sat for the diploma of the Royal Sanitary Institute and all passed.

Courses for Sanitary Overseers were held during the year. 3 candidates qualified in Khartoum and 3 in Juba. Owing to increased demands by the Army and other departments, recruitment of junior staff has become increasingly difficult, but so far it has been possible to maintain a satisfactory standard of candidate for enlistment in this important branch of the service.

YELLOW FEVER CONTROL.

1. Incidence of the Disease.

The epidemic of yellow fever which occurred in the Nuba Mountains in 1940 had subsided by the beginning of 1941. The outbreak at Tagoi in which the cases presented a typical picture of yellow fever proved to be relapsing fever.

Yellow fever restrictions on movement to the Nuba Mountains were relaxed in January but control of movement of people from the Nuba Area by car, steamer or train was retained until later in the year.

There was no recrudescence of the epidemic in the Nuba Mountains during the rainy season of 1941 nor is it known that any case of yellow fever occurred elsewhere in the Sudan. There have been a number of suspected cases in Kordofan, Darfur and Equatoria Provinces but in no instance was the diagnosis confirmed by liver examination.

2. Immunization.

Immunization has been carried out on an extensive scale. In addition to individual inoculations, immunization has included the following groups of persons :

- (a) All members of the Forces.
- (b) All officials, police, railway and steamers personnel, medical staff, school children, missionaries, their families and servants resident in or proceeding to that part of the Sudan, south of Khartoum.
- (c) All guards and employees on aerodromes.
- (d) Mass inoculation of population of villages, in the vicinity of aerodromes, ports and lines of communication.

3. Aedes Control.

The campaign against Aedes mosquitoes has been a feature of the Public Health work of the year. Additional staff has been employed to all areas where vectors are present and the whole system of inspection, reporting and control has been re-organized on a new basis. Routine measures included the inspection and spraying of buildings once a week, the removal from compounds of all receptacles capable of holding water, and the filling of tree and rock holes where breeding might occur. Trains, steamers and aircraft were sprayed to prevent the infiltration of mosquitoes into urban areas.

4. Control of Aircraft.

The work of inspection and disinsectisation has been continued in spite of the heavy increase in traffic. The following inspections were made :—

Khartoum	...	...	...	...	...	...	...	1,006
Malakal	...	...	...	...	...	...	...	430 (6 months)
Juba ...	...	...	...	...	...	...	...	1,014
Geneina	...	...	...	...	...	...	...	1,847
Fasher	...	...	...	...	...	...	...	491
Port Sudan ...	...	...	...	...	...	...	...	69 (3 months)

At Geneina, 5 adult mosquitoes were found in aircraft arriving from West Africa. Of these, three were anopheline and 2 culex. No adults were found in aircraft arriving at Juba and only one, (*Culex pipiens*), at Khartoum in an aircraft arriving from Asmara.

5. Propaganda.

Pamphlets were distributed, posters and notices displayed in prominent places, and lectures and broadcasts delivered from time to time throughout the year.

THE HEALTH AND SANITATION OF PROVINCES.

KHARTOUM PROVINCE.

Area, 5,700 sq. miles — Population, 258,999.

GENERAL.

Rains were light and well spaced. The Nile flood was one of the lowest on record. Conditions were thus unfavourable for mosquito breeding and few cases of malaria were reported from the Three Towns.

There were minor outbreaks of chickenpox and cerebrospinal meningitis and some increase in the incidence of diphtheria and tuberculosis, but there was a welcome drop in cases of enteric fever from 336 to 129.

Dysentery figures emphasise the need for improved methods of sanitation and control of fly breeding, particularly in native lodging areas. In the age group 0-1, enteritis and dysentery accounted for one third of the certified deaths and about one half in the age group 1-5 years.

A reasonably accurate figure for ophthalmias was possible this year. 27,574 cases within the Municipality and 20,604 in the Rural District are an index of dirt conditions.

The problem of waste water disposal has become acute, all the temporary methods have proved ineffective and the provision of water borne sewage has become an urgent necessity.

A great deal of time and thought was given to the subject of overcrowding as a social evil and a menace to health. Slum clearance progresses apace in Khartoum North but in the other two Towns it has been hindered by lack of alternative sites ; arrangements to provide land for native lodging areas in the third class area south of Khartoum was completed and the elimination of undersized and insanitary properties in Khartoum has a chance of going ahead. In Omdurman progress was slow but steady, though clearance is handicapped by the existence of freehold rights ; here plans for new native lodging areas were also under preparation.

A reasonable standard of sanitation was maintained in Army hospitals, military and prisoners of war camps around Khartoum in spite of the constant movement and change in personnel.

VITAL STATISTICS.

POPULATION.

Census of the population showed an increase of some 3,100 over that of 1940. This figure probably does not represent a true increase and is to some extent due to immigration for enlistment and war work.

BIRTHS AND DEATHS.

Registered births in the Three Towns were 4,611, deaths 2,919—an excess of births over deaths of 1,692.

The average death rate for the Three Towns was 13.6 per 1,000. The rate was highest during August, September and October. During these months humidity is high and flies more prevalent, consequently an increase in the incidence of intestinal disease is usually experienced. Enteritis and dysentery still head the list as a cause of death particularly in the age group 1-5.

COMMUNICABLE DISEASES.

CHICKENPOX.

This disease was more prevalent throughout the Province than in 1940. A total of 333 cases were notified.

DIPHTHERIA.

132 cases occurred as compared with 33 last year.

ENTERIC FEVER.

There was a welcome fall in the incidence of enteric fever from 278 to 106. In Khartoum and Omdurman the incidence was practically halved. Factors which may have contributed to this decrease were generally improved sanitation, closure of unhygienic wells, improved sanitary conveniences in public eating houses and inoculation of contacts.

AMOEBIC DYSENTERY.

The incidence in Khartoum remained about the same as in 1940, in Khartoum North it was a greater and in Omdurman considerably less. The incidence is high and a large proportion of the population are carriers. Improved methods of sanitation including a water carriage system and further attention by the public to the prevention of fly breeding are the most important means whereby improvement may be anticipated.

BACILLERY DYSENTERY.

139 cases were diagnosed. The proportion of bacillary dysentery to amoebic dysentery is about 1 to 7.

OPHTHALMIAS.

This is the first year that a reasonably accurate figure has been possible. 27,000 cases were reported in the Municipality. This figure emphasises the prevalence of eye conditions and the importance of early treatment, especially in schools.

THE CENTRAL PRISON, KHARTOUM NORTH.

The health and sanitation of the prison was very satisfactory throughout the year. Rations were adequate in quantity and variety and there was no evidence of deficiency conditions. Sporadic cases of chickenpox occurred but there was no serious outbreak of infectious disease. The incidence of endemic disease was not above that of the general population.

SCHOOL MEDICAL INSPECTION.

12,070 boys and girls were examined during the year as compared with 5,141 in the previous year. This increase in inspections resulted from the incorporation of all private schools in the work of the School Medical Service. The health of the school children was good throughout the year. The chief diseases found were trachoma, dental and visual defects and enlarged tonsils. Treatment was carried

out in the hospitals and dispensaries of the Province. The Assistant Ophthalmic Surgeon visited most of the schools and advised on the course of treatment for every boy or girl suffering from trachoma. The schools dressers carried out the recommended treatment at the school. Visual defects were referred to the Ophthalmic Surgeon or his assistant and dental conditions were seen and treated by the School Dental Officer.

NORTHERN PROVINCE.

Area, 236,200 sq. miles — Population, 921,652.

Despite another year of low Nile there was no food shortage. The economic conditions of the people are rapidly improving as a result of the installation of many additional agriculture pump schemes and the extension of those already in operation.

Despite the heavy drain on staff by military demands, the medical work of the Province has been maintained at previous standards and there has been a steady increase in hospital activities.

In spite of army movements and the presence of prisoners of war camps in several districts, the health of the Province was maintained at a high level. With the exception of an outbreak of cerebrospinal meningitis in the Zeidab area in the spring, no epidemic occurred. In this outbreak 195 cases were reported with 119 deaths. The high death rate was due to the reluctance of patients and their relations to seek early treatment.

The vaccination campaign, commenced on the outbreak of smallpox at Shereik last year, was continued and by the end of the year 30,813 persons had been vaccinated.

There was some increase in the incidence of both amoebic and bacillary dysentery, probably as a result of military movements and the concentration of labourers in certain areas. Thirty nine cases of enteric fever with 20 deaths occurred, mostly in the towns of Atbara and Wadi Halfa, where several carriers of the disease had been detected.

Except in certain reaches of the river in Shendi and Wadi Halfa districts, malarial incidence was below average. This was partly due to the low Nile.

Bilharzia surveys carried out during the year showed that 7% of the population were infected in the southern area, 3% in the Merowe area and 6% in the Wadi Halfa area. Cases fall mostly in the 5-15 age group and the course of the disease is benign in character.

A survey of Eye diseases was carried out in the Merowe and Dongola Districts. The incidence of trachoma varied in different villages from 20% to 76% of those examined. This disease appears to be most prevalent in infancy, as shown by the frequent presence of scarring in children of the 5-15 age group. Tolerance to the disease is high and treatment is most frequently sought in the spring and summer months.

The public health work of the province was carried out under extreme difficulties owing to the removal of senior staff, necessitated by the present emergency and by the presence of military units in the larger towns of the Province.

Additional mosquito men, taken on in all districts, resulted in the malarial situation being kept in hand throughout the year.

The scarcity of buckets for conservancy work led to the evolution of a better type of fly-proof pit latrine which is now installed in several districts.

13,529 school children were examined and their health found to be satisfactory.

Ante-natal clinics established in all the larger towns in the Province continued to function satisfactorily. There are now 89 trained midwives practising in the Province.

BLUE NILE (GEZIRA) PROVINCE.

Area, 54,775 — Population, 1,459,585.

With the exception of numerous outbreaks of relapsing fever, the health of the Province has been generally good. Relapsing fever is now endemic in the Gezira area and has been the cause of wide-spread disability, but fortunately the death rate is low. 2,954 cases with 103 deaths were reported. The continued prevalence of this disease among the floating population of cotton pickers in the Gezira irrigated area is a matter of grave concern. There is little doubt that a very large percentage of the population are infested with lice. The density of infested lice has risen during recent years and energetic and comprehensive measures are indicated if the spread of the disease is to be checked. Owing to the movement of labour to and from the cotton area there is a great danger that the disease will spread further afield. The problem is being dealt with by the institution of village treatment and control. Cases are treated on the spot in temporary hospitals and the whole village population is deloused at the same time. This arrangement has proved fairly efficient and has led to considerable economy in transport and hospital accommodation. During the year 77,509 people were deloused. The prophylaxis of the disease is in the hands of the people themselves, but in spite of intensive propaganda, co-operation has been disappointing, and the necessity for the introduction of measures for the compulsory delousing of the whole population is under consideration.

The situation in regard to malaria has been very favourable. The incidence in the Gezira area shows a small rise over that of 1940 but it must be remembered that 1940 was an exceptionally good year.

In the White Nile area there is a drop in both inpatients and outpatients. This decrease is of especial interest as it was anticipated that the filling of the Jebel Aulia reservoir would give rise to conditions unfavourable to public health and a rise in the incidence of malaria. Statistics kept since 1938 show that there has been a steady decline, yet it would not be wise to draw definite conclusions from these figures as 1939 and 1940 were years of low rainfall, and malarial incidence throughout the northern and central Sudan was below average.

Routine examination for the presence of schistosomiasis infection was carried out in persons attending dispensaries as in previous years. 71,250 persons were examined and of these 16% were found to be infected. The purpose of these annual surveys is to assess the increase or decrease of the disease in the area. The figures for 1941 show that the position remains stationary.

The continuity of public health measures was to some extent hampered by frequent transfers and calls made on the staff for war in other areas. The measures adopted in the control of malaria and bilharzia were the same as in past years. Baling is still the most effective measure in the control of malaria in the irrigated area. In the White Nile district the condition of pump schemes is improving yearly. The tenants are becoming accustomed to the routine of preventative measures of baling and oiling and are cooperating with the public health staff. Several villages have had sections inundated or have been partially surrounded by low lying swampy ground as a result of the rising of the reservoir. Ten of these villages have been moved to new sites. These villages have been built on an approved plan, and

where possible, at some distance from the river ; wells have been dug and should prove a great protection against infection with bilharzia. Living and public health conditions are very much improved and the people realise the advantage of a site away from the river.

The war in the Fung area left behind a legacy of undernourishment resulting in a widespread incidence of tropical sores. Venereal disease has spread among the Ingessana tribe, as a result of contact with infected personnel of military units in the Roseires area.

KASSALA PROVINCE.

Area, 134,450 sq. miles — Population, 439,424.

The health of the inhabitants of this Province has again been good. Two cases of cerebrospinal meningitis which occurred at Sallcm in May and in the Gash in June were isolated and no further cases occurred. Pneumonia caused several deaths at the Gebeit mines in the summer. Undernourishment was widespread in the area north and west of Sinkat from August onwards and with the arrival of winter, the death rate among Arabs in this area was noticeably high. In the southern district kala-azar has been the cause of considerable anxiety and the incidence among visiting troops, both Indian and Sudanese, has been high. Gallabat is a heavily infected area and its evacuation has been ordered.

Despite the filthy state to which the Italians had reduced Kassala Town no major epidemics occurred. There was a very high incidence of malaria and amoebic dysentery among the population at the time of the re-occupation and in addition nearly everyone was suffering from starvation. Any fresh epidemic must have swept away most of the inhabitants.

As a start, the remaining population was quarantined in Khatmia until it was certain that no outbreak of disease was to occur. Imported public health staff worked incessantly, chlorinating and repairing the 120 wells of the town, piling filth into air raid trenches and filling them in, constructing safe water points for the troops, and hunting out mosquito breeding places. Once the town was cleaned up and control services established the incidence of disease was not above the average of recent years.

PORT SUDAN, Population, 29,106.

An exceptionally hot spell occurred in August during which period the maximum temperatures ranged from 108° F. to 117° F. In all, 77 cases of heat exhaustion with one death and 28 cases of heat stroke with 17 deaths were dealt with. Most of the fatal cases came from ships lying in the harbour.

The abnormal demands for labour at the Port caused an influx of workmen from all over the Sudan which was largely responsible for the increase of hospital work. Severe tropical ulcers, usually a rarity in this area, were common ; 215 cases were hospitalised during the last three months of the year.

Bacillary dysentery which was on the increase in December 1941, reached epidemic proportions in one camp during January and February. 127 cases from the Services were admitted during these months. Amoebic dysentery is still one of the main causes of invalidism amongst the native population and little improvement can be expected until some form of conservancy is established in native lodging areas.

The Public Health Service had a difficult year due to the many extra demands thrown upon it. Extra transport and staff helped to ease the situation.

Owing to the greatly increased population, housing of all kinds was overcrowded. Despite war conditions, materials were still available to complete the 25 seats on the water carriage system. Communal pit latrines were given a trial in one camp. The number of waste water pits was increased by 49, and 4 extra lorries and 50 additional sweepers were employed to remove dry refuse.

Weekly house-to-house inspections by mosquito men were continued but were not always satisfactory owing to lack of sufficient supervision. Anopheline infections still remain few and are probably imported. Wells are the principal source of Culex infections.

As usual, flies increased considerably with the more humid weather in the autumn and everything capable of fermentation contributed to the increased fly population. Much remains to be done in the future to remedy faulty construction of latrines and to render these fly proof.

Rat control was continued as in previous years though fewer rats were caught than in 1940.

The following are the figures for the past five years :—

1937	1938	1939	1940	1941
8,499	12,215	16,578	17,224	16,281

Rat Fleas.

The flea census per month together with the prevailing atmospheric conditions was as follows :—

MONTH.	Fleas per rat.	Average Temperature Shade		Average Relative Humidity.
		Maximum °C.	Minimum °C.	
January	0.8%	27.8	19.6	70
February	0.8%	29.4	19.4	65
March	0.8%	28.6	18.2	61
April	0.8%	31.0	23.0	62
May	0.8%	35.7	24.4	54
June	0.8%	40.4	26.1	40
July	0.8%	41.2	29.4	46
August	0.8%	39.3	28.5	51
September	0.9%	38.6	26.2	44
October	1.0%	34.3	26.3	66
November	0.8%	29.8	23.1	61
December	0.9%	29.0	22.2	70

KORDOFAN PROVINCE.

Area, 146,930 sq. miles — Population, 1,332,073.

The public health of the Province has been satisfactory and there was a welcome absence of major epidemics.

No famine conditions occurred except in a district in the Nuba Mountains where relief measures were promptly taken and no adverse effects in the general health were noticed.

Rains in the South were for the most part good but elsewhere disappointing. In the Central and Northern areas it was the lowest rainfall for many years.

The 1941 crops were poor in the North but good in the South. The grain supplies within the Province should be adequate though some redistribution will be necessary.

Both the figures for inpatients and for outpatients established records. The most prevalent diseases causing admission to hospital were syphilis, malaria and gonorrhoea. Malaria remains one of the outstanding causes of sickness. The total number of cases receiving treatment was 27,060 as compared with 30,305 in 1940. The incidence in the Nuba Mountains and Western Kordofan was slightly higher than last year whereas Central, Northern and Eastern Kordofan showed a decrease.

Treatment for syphilis showed a decline though the disease is still very prevalent in the southern part of the Nuba Mountains. The incidence of gonorrhoea has increased, mainly due to war conditions.

The number of cases of dysentery admitted to hospital was about the same as last year but 17 cases of enteric fever were reported as compared with 8 in 1940.

Rabies continued endemic throughout the Province. There were 4 deaths in untreated cases and 330 persons bitten by animals suspected of being rabid received prophylactic treatment.

Minor outbreaks of cerebrospinal meningitis, chickenpox, mumps and measles occurred in several districts but in no case assumed serious proportions.

The epidemic which was reported from the Tagoi area in 1940 and continued until April, 1941 was at first thought to be typical of yellow fever. Further investigation proved the disease to be relapsing fever. 406 cases with 61 deaths were notified before the outbreak subsided.

The Public Health Services of the Province were maintained despite difficulties due to the war and changes in staff. Conservancy systems were extended to meet the increase in the population of towns and a reasonable standard of cleanliness was effected in built-up areas.

Except in the southern part of the Province rains were light and of short duration and anti-mosquito work was less arduous than in average years. Voluntary mosquito control boards, composed for the most part of officials and members of the business community, proved useful in aiding mosquito control in three towns in the Nuba Mountains area.

A start was made in the attempt to eradicate *Aedes aegypti* from the larger towns and along the railway. Mosquito personnel was increased and an Aedes Control Unit formed to carry out surveys and initiate measures to reduce the house index. Orders were issued for the filling in of holes in rocks and trees in rural areas.

The fly danger remains one of the most serious problems to be dealt with. Gastro-intestinal disorders account for a high percentage of mortality and the housefly is probably the major factor in their causation. Despite efforts of the public health staff in El Obeid to affect a reduction in incidence, flies were more numerous than in 1940. The chief breeding grounds were unroofed pit latrines, animal manure and wet household refuse. Efforts were made by propaganda and lectures to make the public appreciate the fly danger and to enlist its co-operation.

DARFUR PROVINCE.

Area, 138,150 sq. miles—Population, 673,160.

The health of the Province was satisfactory and there were no epidemics. An early finish to the rains produced a poor crop in most districts but at the same time resulted in a reduced incidence of malaria.

In a small outbreak of cerebrospinal meningitis, 50 miles south of Fasher, there were 118 cases with 63 deaths.

756 persons in Fasher suffered from influenza.

There were no cases of smallpox but 25,832 persons were vaccinated, excluding figures not yet available for a new campaign commenced in December in Northern and Western Darfur.

3 cases of diphtheria and 11 cases of enteric fever occurred in Fasher. An outbreak of measles occurred in Zalingei district with 338 cases and 200 deaths. The deaths were largely among children and followed an acute diarrhoea due to unsuitable diet.

No cases of yellow fever were reported in the Province. Inoculation of military personnel, officials, police, families and servants was carried out.

84 persons were treated for rabies and 4 died of the disease.

Bilharzia is widespread, vesical in type.

Clinical amoebic dysentery is fairly common in the whole of Darfur. There appears to be little or no bacillary dysentery.

Apart from wounds and injuries, syphilis is the commonest cause of attendance for medical treatment. Gonorrhoea is prevalent in the larger towns of Darfur. Few cases are reported from outside dispensaries.

In Fasher a campaign against Aedes mosquitoes has been the main feature in public health work during the year. The additional staff employed has made it possible to improve anti-malarial work and widespread oiling was carried out. The main source of Anopheline infection were pools in the Wadi and small pools around the town. This year only 456 infections were found as compared with 8,000 in 1939. The incidence of malaria was remarkably reduced.

Minor extensions to conservancy systems were carried out during the year but refuse disposal was not so well maintained owing to prisoners being employed on more urgent work.

UPPER NILE PROVINCE.

Area, 92,270 sq. miles—Population, 487,110.

An analysis of illness amongst the staff of this Province showed an improvement over 1940 in the case of British personnel and an increase in the case of Sudanese and Egyptian officials. The average days sick was, however in the case of the latter, less than in 1940.

No serious epidemics were reported. A few scattered outbreaks of cerebrospinal meningitis occurred, mostly in the northern districts. Cases responded well to treatment and the mortality was not high.

One case of smallpox was admitted to hospital and recovered. 20,989 vaccinations were carried out in the Province during the year.

Malaria pursued its normal seasonal course. More cases were treated in Malakal during 1941 than in 1940 especially during the month of October. 90% of the cases were malignant tertian infections.

There is further evidence that leishmaniasis is more widespread than was previously supposed. 57 cases were admitted for treatment during the year with 24 deaths, an increase of 55 over the admissions for 1940. 10 of these cases occurred at Kodok, situated on the west bank of the Nile where the disease hitherto has not been known to be endemic. Young males are chiefly affected and the incubation period appears to be 6-8 months.

There was a further increase in the incidence of enteric fever. 27 cases were admitted as compared with 17 cases in 1940 and 4 in 1939. Enteric fever has been endemic in Malakal for a number of years and in 1938, there was a sharp outbreak of 46 cases. An investigation was carried out for the detection of carriers. Many of the convalescent cases of typhoid fever were traced and of these, three were found to be carrying bacilli. It is apparent that there, as elsewhere, the observation and care of convalescents is an important measure in the control of the disease. The lack of an efficient conservancy system in the native lodging area is contributory to the annual recurrence of infections. Unfortunately this extension again has had to be postponed owing to the present emergency.

In spite of additional army commitments and shortage of staff, sanitation was maintained at a reasonable standard. Anti-aedes measures and the control of aircraft severely taxed the resources of local public health staff.

EQUATORIA PROVINCE.

Area, 159,025—Population, 1,207,933.

There was no severe or extensive epidemic. The rains were on the whole good and the crops plentiful.

The total recorded medical work in hospitals and dispensaries reached about the same level as in 1940, although there was some re-distribution of this work amongst districts, Juba, Torit and Kapoeta showing increases due to the influx of labour and the Army.

There was considerable movement of bodies of men into and out of the Province and between Districts. These men were examined whenever possible before leaving their homes and again on reaching their destinations.

Inoculation with T.A.B. and vaccination against yellow fever and smallpox were carried out on a considerable scale. Control of mosquito breeding, particularly of Aedes, was extended and carried out more closely.

Whilst it is true that no real epidemic disturbed the Province, it cannot yet be said that there is any evidence of a definite reduction in the great endemic diseases. Ankylostomiasis, bilharziasis, dracontiasis, venereal diseases and tropical ulcers are still only too common. These endemic diseases, depending as they do upon the habits of the people, demand for their control and eventual eradication the willing and understanding co-operation of the people themselves.

A good deal of attention was paid to improvements in living conditions in district headquarters.

A nutrition committee was formed and it was hoped to start a survey of the food of different tribes in the Province. Unfortunately the field worker for this survey was called to another post.

Much care was given to the training of junior staff, as improvement in medical work and in the health of the people depends so largely on their knowledge and skill. English classes were given at hospitals together with lectures and demonstrations.

There was a sharp localised epidemic of sleeping sickness in the Meridi district; its very nature suggested importation of the disease into a silent area.

Cerebrospinal meningitis continued in the Wau district with about 1,000 cases but declined in number in the Rumbek area. A few sporadic cases were seen in Juba and Torit.

Trans-African air traffic together with the Nuba Mountains epidemic focussed attention on yellow fever. One possible case occurred at Aweil whilst a fatal case of jaundice in Juba Hospital was not confirmed pathologically to be Yellow Fever. A scheme of Aedes control was drawn up, mosquito men were trained and posted to centres along lines of communication. Medical and sanitary staff, police, merchants, car drivers and school children living in these centres were inoculated. Practically the whole population of Juba together with that of the villages within a radius of some five miles was inoculated. Inoculation continues throughout the Province but is limited by the real difficulties of the transportation of the vaccine. Leaflets have been widely distributed and talks given at chief's courts and schools.

An outbreak of bacillary dysentery in the Lui district in the summer resulted in at least 40 deaths.

There were seven cases of smallpox imported into Juba from the Belgian Congo. The disease did not spread. Variola minor continued to occur in the Rumbek area. Vaccination was carried out on a scale not heretofore attempted. The occupants of motor vehicles crossing the frontier from the Congo were inspected and offered vaccinations.

Juba had 17 sporadic cases of typhoid fever. Some of these cases were undoubtedly connected with travel on Nile steamers but no common source of infection could be discovered. Mass inoculation with T.A.B. was carried out.

A case of tick typhus occurred in a British patient. This is the first recorded case of typhus in the Sudan. It may now prove that some obscure cases of fever among natives will be found to be due to typhus.

Scurvy broke out among soldiers of the Sudan Defence Force in forward areas but the disease was recognised and successfully treated in an early stage.

Relapsing fever was found in the local population of Maji, but did not spread to the S.D.F., stationed there. On evacuating the town all troops were quarantined and deloused before returning to their homes in the Sudan.

Malaria is, of course, widespread in Equatoria. It is probably the commonest cause of death in infancy among the native population and the chief cause of sickness and invalidism amongst immigrants into the Province. The conditions in which British officials serve, in and out of their stations, makes infection with malaria often merely a matter of chance, even when reasonable precautions are taken. This year was in any case a bad one particularly so in Juba and Wau. Effective mosquito control is well nigh impossible even in a few selected limited areas and reliance for protection of susceptible persons must be placed mainly on mosquito wire, nets and insecticide.

In Juba the drainage system was improved to dispose of storm water. The staff of mosquito men was increased throughout the Province and in most stations due regard was paid to the importance of keeping the residential area clear of tall grass.

The venereal diseases, common in the western districts, showed no sign of permanent establishment in other parts of the Province. The satisfactory treatment of yaws in dispensaries is possible but that of syphilis and gonorrhoea is yet to be set up.

There was no change in the incidence of ankylostomiasis and bilharziasis and only an enlightened and prosperous population will free itself of these diseases; there is no evidence of spread to the East. Despite such steps as could usefully be taken to provide protected water supplies the apparent incidence of guinea worm rose, although it has not spread to new areas.

Tropical ulcers cause widespread disability, misery and a number of deaths. They are generally amenable to treatment and present a field of work for dispensaries and chiefs dressers who may see them in the early stages.

Rabies appears to be endemic in large areas of the Province. There were two human cases of hydrophobia.

Sleeping sickness was controlled, except for the new outbreak in Meridi District, by established methods. The block clearing system was reviewed and new methods of fly control are being tried out. A pass system, similar to that in operation with French Equatorial Africa, was set up with the Belgian Congo, which, if effective, should prove of benefit to the Sudan.

Tuberculosis, although not commonly seen, was found to exist even in remote villages. It is not likely, then, to be a recent infiltration, and rapid spread is improbable.

Sanitation in the principal towns continues to improve and the standard on the whole is fair. Progress is being maintained in the provision of pit and bucket-latrines throughout the Province.

MATERNITY AND CHILD WELFARE.

16 midwives passed the qualifying examination and were licensed to practise in the Sudan. 378 midwives have been trained since the School opened, of whom 296 are still in practice. The distribution of midwives in the Provinces is as follows:

Khartoum	...	...	...	73	Kordofan	...	...	...	40
Blue Nile	...	...	...	59	Darfur	...	...	...	10
Northern	...	...	...	85	Upper Nile	...	...	...	4
Kassala	...	...	...	25					

26 trained midwives attended revision courses.

MATERNAL MORTALITY.

It is only in the towns where the population is entirely served by trained midwives that it is possible to obtain reliable information regarding maternal mortality and the complications of child birth.

The midwives of Omdurman attended 2,084 (2,015) cases, 20 (20) being classed as abnormal. 74 (46) patients were transferred to hospital where 4 died. There were no deaths in the district. 57 (43) cases of abortion were treated by the midwives of whom 7 were transferred to hospital.

The number of registered live births in Omdurman was 2,059 (2,000). The number of maternal deaths was 14 (16).

Total Maternal Mortality Rate (Omdurman)...	...	...	...	...	6.8 (9.9)
Infantile Mortality Rate (Omdurman)	...	...	...	...	70.7 (90.8)

The following statistics are compiled from the records of cases treated in hospitals of Khartoum, Khartoum North and Omdurman.

Total number of live births registered in the Three Towns was 3,580 (3,617).

Total cases attended in hospital 451.

(a) Normal	....	....	57 (44)	(c) Recovered	....	....	437 (350)
(b) Abnormal	....	....	394 (322)	(d) Died	....	....	14 (16)
(e) Live Births in hospital			....	....	179 (146)		

Complications and Causes of Death.

						Total.	Recovered.	Died.
Abortions	....	Septic	....	....	9 (7)			
		Others	....	....	137 (80)	146 (87)	144 (84)	2 (3)
Puerperal sepsis	....	Normal labour	....	....	28 (25)			
		Abnormal labour	....	....	18 (20)	46 (45)	44 (41)	2 (4)
Puerperal haemorrhage	....	Placenta praevia	....	....	11 (4)			
		Other causes	....	....	21 (22)	32 (26)	29 (25)	3 (1)
Puerperal albuminuria and convulsions	....		....	....	....	16 (9)	15 (8)	1 (1)
Other toxæmias of pregnancy	....		....	....	....	9 (9)	9 (9)	— (—)
Phlegmasia alba dolens	....		....	....	....	2 (4)	2 (3)	— (1)
Embolism	....		....	....	....
Other accidents and abnormal condition of the puerperal state						77 (89)	71 (83)	6 (6)
Illness complicating, but not directly due to pregnancy	....					85 (67)	80 (66)	5 (4)
						413 (220)	394 (218)	19 (20)

The figures in brackets are those recorded for 1940.

MATERNAL AND CHILD WELFARE CLINICS.

93,258 (58,770) attendances, of which 18,756 (8,431) were new cases, were recorded at 24 centres in the towns of the Northern Sudan and one in the Southern Sudan.

12,722 (9,025) attendances, with 3,965 (3,515) new cases were reported from the clinics in Khartoum, Khartoum North and Omdurman.

The infant mortality rate for the Three Town was as follows:—

Khartoum	...	...	...	...	...	111.4	per 1000 live births.
Khartoum North	...	...	...	...	...	70.7	„ „ „ „
Omdurman	...	...	...	...	...	115.7	„ „ „ „

(The low figure for Khartoum North is probably due to inaccurate registration.)

82% of the cases delivered at the Midwifery School had attended the ante-natal clinic. Many of the cases were also visited in their homes by their own midwives.

A new Child Welfare Clinic was opened in Omdurman during the year and proved a great success. 1,421 cases attended the Centre and 2,925 visits were made by the Health Visitor to children in their homes.

SCHOOL MEDICAL SERVICE.

50,834 pupils were examined in 515 schools as compared with 42,572 in 504 schools in 1940. In Khartoum Province, 12,070 boys and girls were examined as compared with 5,241 in the previous year. This increase was due to the inclusion of private schools in the scheme of examination.

Periodic inspections of school children and school buildings are made by Medical Inspectors of Provinces. Medical officers and assistants carry out routine examination and treatment. In Khartoum a whole-time Medical Officer is now employed on school work while inspection and care of the teeth is carried out by a qualified dental surgeon. The Assistant Ophthalmic Surgeon visits most of the schools in Khartoum and advises on the course of treatment for every boy or girl with trachoma. School dressers carry out the treatment recommended.

Trachoma, dental and visual defects are the commonest conditions found on examination in schools of the Northern Sudan.

The incidence of urinary bilharzia continues high in Darfur, Kordofan and the Halfa districts of the Northern Province, but infected children rarely complain of symptoms and the disease tends to die out in adult life.

The health of school children in the Southern Sudan was on the whole good although many cases of the endemic diseases were found among them. Their general state of nutrition is satisfactory. Chief diseases found on examination are splenic enlargement, skin and intestinal diseases and dental defects. Rectal bilharzia and ankylostomiasis are common infections. This is to be expected in a country where sanitation is still an innovation and where the cause of disease is as yet little understood.

In both the Northern and Southern Sudan, attention has been paid to better living conditions of pupils. In many stations improvement has been possible in the provision of new and better dormitories and classrooms, improved water supplies and increased latrine accommodation, but much remains to be done.

Talks on personal hygiene and the prevention of the commoner diseases are given by teachers and medical staff and it is hoped that results of treatment and propaganda will in time take effect.

The following table shows the results of the examination :—

PROVINCE AND DISTRICT.	No. Exam.	% Tracho- ma	% Bilhar- zia	% Spleen	% Pulm. T.B.	% Ancy- lost.
Blue Nile Province :—						
GEZIRA AREA.						
3 Intermediate	329	19.4	—	14.8	—	—
18 Elementary	2562	21.7	1.05	14.7	—	—
126 Village Schools	8262	19.6	0.4	25.6	—	—
5 Girls Schools	330	33.3	—	—	—	—
WHITE NILE AREA.						
1 Teachers Trg. Sch.	110	17.2	4.5	20.0	—	—
1 Sch. of Science	8	—	—	12.5	—	—
2 Girls Schools	196	58.1	—	30.2	—	—
6 Elementary	991	41.8	1.8	30.5	—	—
1 Village School	45	8.8	2.2	6.6	—	—
FUNG AREA.						
9 Elementary	941	19.8	2.5	52.9	—	—
5 Village Schools	161	26.08	4.5	45.3	—	—
3 Girls „	271	18.5	0.7	26.1	—	—
Darfur Province :—						
Fasher District	612	79.6	31.9	20.3	—	—
Geneina District	225	103.6	14.7	58.7	—	—
Nyala District	267	23.6	34.82	35.2	—	—

PROVINCE AND DISTRICT.					No. Exam.	% Tracho- ma	% Bilhar- zia	% Spleen	% Pulm. T.B.	% Ancy- lost.
Equatoria Province :—										
Juba	3	Mission	Schools	...	379	14.8	1.6	39.6	—	6.33
Wau	10	Element.	"	...	937	5.33	11.2	47.2	—	12.1
Rangu	4	Element.	"	...	184	—	21.7	34.8	—	27.2
Rumbek	1	Element.	School	...	89	—	—	32.6	—	8.9
Yubu	2	Mission	Schools	...	371	—	8.6	23.5	—	7.5
Meridi	2	Mission	"	...	90	—	53.3	42.2	—	12.2
Yei	1	Interm.	School	...	93	59.1	4.3	36.6	1.07	3.2
Torit	1	Interm.	"	...	481	22.9	1.7	34.9	—	6.02
	4	Element.	Schools	...						
Kapoeta	1	Element.	School	...	52	25.0	—	34.6	—	—
Lui	1	Mission	"	...	87	—	6.9	18.4	—	20.7
Kassala Province :—										
Kassala	...	...	...	...	—	—	—	—	—	—
Gedaref	...	...	...	...	281	18.1	—	18.1	—	—
PORT SUDAN :—										
	1	Intermediate	...	...	137	1.5	—	—	—	—
	1	Elementary	...	...	217	11.5	—	—	—	—
Khartoum Province :—										
Gordon College	...	...	...	...	530	20.4	0.19	1.1	—	—
Interm. Boys Schools	...	...	...	...	2,802	29.2	0.21	1.5	—	0.9
Interm. Girls	...	...	...	...	926	26.6	—	0.7	—	—
Elementary Schools	...	...	...	...	4,151	41.4	0.04	1.5	—	—
Village Schools	...	...	...	...	3,663	67.4	—	2.7	—	—
Kordofan Province :—										
CENTRAL DISTRICT.										
	1	Intermediate	School	...	144	6.9	4.9	20.1	—	—
	9	Elementary	Schools	...	1,331	19.8	6.3	14.3	—	—
	3	Village	Schools	...	233	17.6	6.9	24.9	—	—
WESTERN DISTRICT.										
	5	Elementary	Schools	...	630	19.8	16.8	33.8	—	—
	8	Village	Schools	...	353	21.2	15.6	41.1	—	—
NUBA AREA.										
	8	Elementary	Schools	...	838	13.8	28.8	36.9	—	—
	5	Village	Schools	...	261	8.4	23.8	54.4	—	—
Northern Province :—										
ATBARA DISTRICT.										
	2	Intermediate	Schools	...	239	34.3	7.5	4.2	—	—
	18	Elementary	"	...	2,372	34.3	5.9	6.6	0.04	0.12
	53	Village	Schools	...	2,802	39.4	4.5	12.5	—	—
SHENDI DISTRICT.										
	5	Elementary	Schools	...	641	49.6	—	8.3	—	0.31
HALFA DISTRICT.										
	1	Intermediate	School	...	158	19.7	3.8	3.2	—	0.63
	13	Elementary	Schools	...	1,227	42.5	7.5	7.3	—	0.2
	14	Village	Schools	...	1,677	38.1	11.03	6.8	—	0.71
MEROWE AND DONGOLA.										
	12	Elementary	Schools	...	3,490	27.6	2.05	5.1	—	0.14
	11	Village	Schools	...	3,464	35.9	2.2	9.7	—	0.02
Upper Nile Province :—										
MALAKAL.										
	1	Elementary	School	...	107	0.93	—	6.5	—	—
	3	Mission	Schools	...	87	11.5	—	35.9	—	—

QUARANTINE.

PORT SUDAN QUARANTINE.

The Port had an exceptionally busy year. The abnormal demands for labour caused an influx of workmen from all over the Sudan.

The Ports of Mombasa and Haifa were declared infected with plague on June 30th and August 20th respectively. Quarantine restrictions were imposed on passengers arriving by sea route from Port Said on account of plague as from September 17th. All these restrictions were still in force at the end of the year.

No ships were quarantined during the year. Two cases of diphtheria were removed from a ship arriving in the Port.

The health of the Port and District was satisfactory. The necessary quarantine and preventive measures were taken with the contacts of sporadic cases of cerebrospinal meningitis, enteric fever and diphtheria.

SUAKIN PILGRIM QUARANTINE.

The 1940-41 pilgrimage was a small one, 2,085 pilgrims left Suakin for Jeddah, and 2,081 returned. The outgoing pilgrimage for the season 1941-1942 broke all records, amounting to 8,467. The figures for pilgrims who have sailed from Suakin during the last 12 years are as follows :—

1931	2,414	1935	1,672	1939	5,523
1932	1,348	1936	3,404	1940	3,204
1933	970	1937	6,346	1940/41 ...	2,085
1934	1,459	1938	8,159	1941/42 ...	8,467

All pilgrims were vaccinated and inoculated against smallpox and cholera before departure from Suakin to Arabia Saudia.

Calf lymph and cholera vaccine were made in the Stack Laboratories. In addition, all pilgrims leaving on the 1941-42 pilgrimage were inoculated against yellow fever. Pilgrims paid in advance their return journey fare and the quarantine charges in Arabia Saudia.

The pilgrimage was declared clean and its quarantine period fixed at 8 days ; no case of smallpox occurred amongst returning pilgrims. The health of returning pilgrims was satisfactory. 35 cases were admitted to hospital including 18 cases of chickenpox.

WADI HALFA QUARANTINE.

2,130 Egyptian labourers passed through the quarantine. 13 were rejected and 579 treated for bilharzia either at Wadi-Halfa or their destination.

OPHTHALMIC REPORT.

BY MR. A. R. McKELVIE.

The Eye Department at Khartoum contains 70 beds of which 46 beds are provided for male and the remainder (24) are for female.

The following figures summarise the work carried out during the year.

						Khartoum Eye Hospital	Omdurman Eye Hospital	TOTAL
INPATIENTS.								
1939	...	...	...	...	...	693	146	839
1940	...	...	...	...	...	582	112	694
1941	...	...	...	...	...	651	102	753
OUTPATIENTS.								
1939	...	...	...	...	...	44,230	29,811	74,041
1940	...	...	...	...	...	52,918	31,416	84,334
1941	...	...	...	...	...	78,965	30,361	109,326
NEW CASES								
1939	...	...	...	...	...	9,391	8,511	17,902
1940	...	...	...	...	...	10,341	11,158	21,499
1941	...	...	...	...	...	12,245	12,479	24,724
OPERATIONS.								
<i>Major.</i>								
1939	...	...	...	...	...	549	125	674
1940	...	...	...	...	...	408	90	498
1941	...	...	...	...	...	565	112	677
<i>Minor.</i>								
1939	...	...	...	...	...	292	10	302
1940	...	...	...	...	...	307	15	322
1941	...	...	...	...	...	580	30	610

EYE OPERATIONS PERFORMED IN KHARTOUM EYE HOSPITAL IN 1941.

MONTHS	CATARACT		GLAUCOMA			ENUCLEATION	PTERYGIA	STAPHYLOMA	TRICHIASIS	TRICHLORACETIC	TATTOO	PARACENTESIS	FOREIGN BODY IN ORBIT	XEROPHTHALMIC	RETROBULBAR ABSCESS	TUMOUR		DACRYOCYSTITIS	EXPLORATION	PLASTIC OPERATIONS	MINOR OPERATIONS	TOTAL
	Extraction	Needling	Trephine	Cyclodialysis	Filtrating Iridectomy											Innocent	Malignant					
January	8	1	—	—	6	1	—	—	6	—	—	—	1	—	—	—	—	—	—	—	55	84
February	13	4	—	—	1	—	4	—	7	—	—	—	—	—	—	—	—	—	—	6	42	79
March	9	6	2	2	8	1	2	1	9	—	—	—	—	—	—	1	—	—	—	4	59	104
April	23	5	3	1	9	—	1	—	5	1	—	1	—	—	—	2	1	—	—	4	52	109
May	21	1	—	—	4	2	4	—	15	—	—	—	—	—	—	1	—	2	1	2	48	101
June	22	1	—	—	8	1	3	1	13	—	1	—	1	—	—	1	—	—	—	3	52	109
July	9	1	1	1	17	—	10	—	13	1	—	1	1	—	—	—	—	1	—	6	40	102
August	24	—	—	—	8	—	5	1	10	2	2	1	—	—	1	—	—	—	—	2	49	102
September	16	1	1	—	8	1	10	1	2	2	1	—	—	—	1	—	—	1	—	2	45	94
October	7	—	1	—	10	—	10	—	5	1	1	—	—	—	—	—	—	—	—	2	45	82
November	16	—	1	—	7	—	7	—	13	—	—	—	—	1	—	—	—	—	—	3	42	90
December	8	—	2	—	9	—	9	—	9	—	1	—	—	—	—	—	—	—	—	—	51	89
TOTAL	176	20	15	4	95	7	71	4	107	7	5	3	3	1	1	6	1	4	1	34	580	1,145

INPATIENTS . TREATED IN THE

MONTHS.	EYELIDS			CONJUNCTIVA				Lachrymal apparatus	CORNEA						IRIS AND CILIARY BODIES	
	Blepharitis.	Chalazion	Trichiasis	Conjunctivitis	Trachoma	Phlyctenula	Pterygium	Dacryocystitis	Corneal growth	Ulceration	Keratitis	Corneal wound	Foreign Bodies	Leucoma	Iridoc. & Iritis	Prolapse to Iris
January ...	—	—	2	22	2	—	—	—	1	3	1	—	—	—	1	—
February ...	1	1	4	24	7	—	1	—	—	2	3	—	—	1	—	—
March ...	1	—	3	18	7	—	—	—	—	—	1	—	3	4	2	2
April ...	1	1	2	20	4	—	—	—	—	3	1	—	—	1	2	—
May ...	3	1	4	14	5	—	—	—	—	4	3	—	—	2	—	—
June ...	2	—	5	18	4	—	—	—	1	1	—	—	2	3	—	—
July ...	—	—	2	19	9	—	1	—	—	2	—	—	—	7	—	1
August ...	—	—	2	9	5	—	—	—	—	2	1	—	2	4	1	—
September ...	1	—	6	22	5	—	1	—	—	1	—	—	—	4	3	—
October ...	—	—	1	12	2	—	—	—	—	1	—	—	—	2	1	—
November ...	1	—	2	19	3	—	—	—	—	2	1	—	—	3	4	—
December ...	—	—	2	8	2	—	1	—	—	1	—	—	—	3	1	1
TOTAL ...	10	3	35	205	55	—	6	—	2	22	11	—	7	34	15	4

OUTPATIENTS TREATED IN THE

MONTHS	EYELIDS			CONJUNCTIVA				Lachrymal apparatus	CORNEA						IRITIS AND CILIARY BODIES	CHOROID	RETINA	
	Blepharitis	Chalazion	Trichiasis	Conjunctivitis	Trachoma	Phlyctenula	Pterygium	Dacryocyclitis	Corneal growth	Ulceration	Keratitis	Corneal Wound	Foreign Bodies	Leucoma	Iridocyclitis and Iritis	Prolapse	Choroiditis	Retinitis
January	18	33	24	568	123	—	35	—	1	9	15	28	43	18	16	—	—	—
February	11	26	22	624	102	1	21	—	—	15	11	—	30	14	9	—	—	—
March	12	22	18	667	142	—	19	1	—	—	6	20	47	20	7	2	—	1
April	18	33	20	716	127	—	22	—	—	3	12	22	40	18	11	—	1	—
May	12	32	16	489	96	—	23	—	—	4	13	21	33	21	7	—	—	—
June	19	36	19	416	78	—	21	—	1	1	9	23	40	19	10	—	—	—
July	5	39	16	502	122	—	20	—	—	2	5	14	25	27	11	1	—	—
August	9	29	18	497	106	2	18	1	—	2	10	14	37	16	8	1	—	—
September....	12	43	19	509	75	6	19	—	—	1	5	23	33	14	10	—	1	—
October	15	32	14	584	82	2	20	—	—	1	5	20	33	11	8	—	—	1
November....	13	39	17	635	101	3	18	—	—	2	8	30	30	10	12	—	—	—
December....	15	30	13	504	81	4	22	—	—	1	6	19	39	21	6	1	—	—
	159	394	216	6,711	1,235	18	258	2	2	41	105	234	430	209	115	5	2	2

EYE DEPARTMENT 1941.

		OPTIC NERVE		LENS AND VITREOUS				EYE-BALL			SQUINT		DEFECTIVE VISION			VARIOUS		TOTAL	
		Papilloedema	Atrophy	Cataract Congenital	Senile	Traumatic	Opacity	Injury Ophthalmitis	Acute Glaucoma	Chronic Glaucoma	Strabismus Convergent	Strabismus Divergent	Hypermetropia	Myopia	Astigmatism	Amblyopia	Staphyloma		Phthisis
-	-	-	-	-	6	1	1	-	2	-	-	-	-	-	-	-	-	-	42
-	-	-	-	-	15	4	-	-	2	4	-	-	-	-	-	-	3	1	73
-	1	-	-	1	10	1	-	-	8	-	-	-	-	-	-	-	1	3	66
-	-	-	-	-	14	1	-	1	3	-	-	-	-	-	-	-	-	1	55
-	-	-	1	-	18	-	-	-	5	-	-	-	-	-	-	-	1	-	61
-	-	-	-	-	20	3	-	-	4	-	-	-	-	-	-	-	1	1	66
-	-	3	-	1	4	2	-	-	5	-	-	-	-	-	-	-	1	-	58
-	-	1	-	-	10	3	-	-	4	-	-	-	-	1	-	-	1	1	46
1	-	-	-	-	15	-	-	-	1	1	-	-	-	-	-	-	-	-	61
-	1	-	1	-	2	1	-	-	4	-	1	-	-	-	-	-	2	-	33
-	-	-	-	-	15	2	-	-	7	-	1	-	-	-	-	-	-	-	60
-	-	-	-	-	7	-	-	-	3	-	-	-	-	-	-	-	1	-	30
1	2	4	2	2	136	18	1	1	48	5	2	1	-	1	-	-	11	7	651

EYE DEPARTMENT DURING 1941.

OPTIC NERVE		LENS AND VITREOUS				EYE-BALL			SQUINT		DEFECTIVE VISION				VARIOUS			TOTAL NEW CASES.	TOTAL ATTENDANCES.	
Papilloedema	Atrophy	Cataract Congenital	Cataract Senile	Cataract Traumatic	Opacity	Injury Panophthalmitis	Chronic glaucoma	Acute glaucoma	Strabismus Convergent	Strabismus Divergent	Hypermetropia	Myopia	Astigmatism	Amblyopia	Staphyloma	Phthisis	Eyesight Test			
-	-	—	47	12	1	—	22	—	-	-	54	7	4	-	9	-	-	1,087	5,832	
-	-	—	55	10	—	—	18	4	-	-	34	2	3	-	7	5	-	1,027	6,219	
-	-	1	48	3	—	—	24	—	-	-	50	5	2	1	4	10	1	1,137	6,508	
-	-	—	49	7	—	1	19	—	-	-	52	5	2	1	3	4	15	1,203	6,228	
-	1	—	47	4	—	—	21	—	-	-	64	2	2	-	4	4	-	917	6,006	
-	-	—	57	10	—	—	20	—	-	1	67	5	5	-	6	9	-	871	5,720	
3	-	1	40	8	—	—	17	—	-	1	50	4	3	-	3	4	-	930	6,140	
1	-	—	40	7	—	—	11	—	-	-	34	5	1	1	5	6	-	882	5,214	
2	-	—	43	8	—	—	14	1	-	-	108	7	5	-	-	7	-	964	4,487	
1	1	—	46	12	—	—	16	—	1	-	81	6	3	2	6	11	-	1,015	5,270	
-	-	—	48	9	—	—	17	—	1	-	111	5	5	1	3	3	133	1,255	5,270	
-	-	—	44	7	—	—	13	—	-	-	86	7	4	1	3	4	26	957	3,826	
7	2	2	564	97	1	1	212	5	2	2	791	60	39	7	53	67	175	12,245	66,720	
																			12,245	
GRAND TOTAL ...																			78,965	

REPORT ON THE STACK MEDICAL RESEARCH LABORATORIES FOR THE YEAR 1941.

BY DR. E. S. HORGAN.

RESEARCH.

The campaign on the Eastern Frontier and the greatly increased amount of routine work necessitated by the war have seriously curtailed research activities especially in connection with Kala Azar. In spite of these adverse factors, it has been possible to continue further investigations on the Yellow Fever epidemic (1940) in the Nuba Mountains in co-operation with Dr. A. F. Mahaffy and his staff of the Yellow Fever Research Institute in Entebbe and some important results have been obtained.

War needs have also necessitated a considerable amount of *ad hoc* research on various problems chiefly in connection with the bacteriological examination of canned food stuffs. The Laboratories were also responsible for the issue of all glucose saline and pyrogen free distilled water (for dried plasma) during the Eritrean campaign.

ROUTINE AND EDUCATIONAL ACTIVITIES.

A summary of the routine examinations is appended to this report; the total number of examinations was 30,385 as compared to 25,686 in 1940. This total does not include the food examinations referred to in the preceding paragraph. The chief increases have been in Kahn Tests, Widal Reactions and blood cultures and the number of cerebro-spinal fluids examined also shows a jump from 59 (1940) to 162, chiefly accounted for by a small outbreak of cerebro-spinal fever in Atbara during March and April. After comprehensive trials two new techniques have been adopted for routine examinations in the Stack Laboratories. (1) The zinc sulphate flotation method of Faust for the diagnosis of protozoa and helminths in faeces. (Faust *et alii*—1939. *Jl. of Parasit.* Vol. 25—p. 241), (2) Field's stain (brilliant cresyl blue) for malaria parasites in thick blood films. In the writer's opinion this stain is one of the most outstanding advances in tropical laboratory technique for many years.

Staff Changes.

Mr. A. J. Baillie, the junior British Laboratory Assistant resigned at the beginning of the year and his successor has not yet arrived. Apart from the extra military demands, this resignation threw a greatly increased burden of routine work on the remaining 3 British Laboratory Assistants who have rendered most valuable service during a trying year.

Two more Sudanese Laboratory Assistants were trained, the total now being 32. Two were seconded to the Sudan Defence Force for the Eritrean campaign; one has now returned to civilian duties. The number of hospital laboratories (26) remains unchanged.

ROUTINE.

PATHOLOGOLOGICAL SPECIMENS.

The total was 425.

POST MORTEM EXAMINATIONS.

17 were carried out in Khartoum Civil Hospital including 8 medico-legal requested by the police authorities. From the teaching point of view the position remains deplorable and shows no signs of any improvement.

NEOPLASMS.

191 were received of which 130 were malignant.

SITE.	Carcinoma	Sarcoma.	Endothelioma	Melanoma.	Total
Breast	22	2	—	—	24
Face	9	4	1	—	14
Neck	1	—	—	—	1
Scalp	3	—	—	—	3
Lip and Mouth	5	2	3	—	10
Arm and Hand	3	6	—	—	9
Leg	3	9	—	—	12
Foot	1	3	—	9	13
Eye	3	5	—	1	9
Thyroid gland	6	—	—	—	6
Parotid gland	1	—	—	—	1
Abdomen (site not stated)	2	1	—	—	3
Rectum	1	—	—	—	1
Anus	2	—	—	—	2
Bladder	1	—	—	—	1
Prostate	1	—	—	—	1
Prepuce	2	—	—	—	2
Scrotum	1	—	—	—	1
Uterus	3	2	—	—	5
Ovary	1	—	—	—	1
Spinal Cord	—	—	1	—	1
Axillary Glands (secondaries)	—	—	—	1	1
Unclassified	4	5	—	—	9
TOTAL	75	39	5	11	130

Included under the heading of Carcinoma were 13 Epitheliomata and 4 Rodent Ulcers. There is the usual high incidence of Melanomata of the foot.

RABIES.

124 brains were received of which 3 were decomposed and useless.

35 were positive for Negri bodies, the distribution being 2 horses, 1 donkey, 1 cat, 2 camels and 29 dogs.

Rabies Vaccine.

62,075 c.cmc. were issued.

KALA AZAR.

A number of cases occurred in British, Indian and Sudanese troops serving on the Eastern Frontier in a well known kala azar region. Experience with these cases confirmed the views previously expressed that Sudan kala azar in its severity

and resistance to treatment (Antimony and 4 : 4' Diamidino-Stilbene, (M & B 744), differs from the Indian variety. Owing to the absence of pentavalent antimony compounds a considerable amount of M & B 744 which had previously shown satisfactory results (Report 1940) was issued for general military and civilian use in the Sudan. It was also possible to supply certain quantities to Middle East Headquarters.

Reports from various hospitals have drawn attention to certain toxic effects in addition to those already described (Kirk and Sati 1940—Ann. Trop. Med. and Parasit. Vol. 34. p. 83).

A short summary of these may be useful—(a) Nervous; paraesthesia, hyperaesthesia, anaesthesia, more common on the face and sometimes associated with a peripheral neuritis affecting the lower extremities, (b) thrombosis of veins at site of injection. The causation of the latter is obscure but certain individuals have shown a peculiar susceptibility on repeated occasions. Recent observations suggest that the drug may have a cumulative toxic effect on the liver but at present it is impossible to make any definite statement.

TYPHUS FEVER.

In view of the previous negative results (Report 1937) it is interesting to record the first autochthonous case of typhus fever from the Sudan. The patient, a missionary in the Southern Sudan was seen by Dr. Somers, Juba Hospital, complaining of fever, severe headache and prostration. The presence of a petechial rash made Dr. Somers suspect Typhus and a specimen of blood was sent to the Laboratories for the Weil-Felix Reaction. This showed a positive agglutination of O X 2 1 in 1250, O X K 1 in 50 and O X 19 negative. In spite of the absence of a primary ulcer this result is strongly suggestive of African Tick Typhus. Enquiries as to the patient's movements during the previous month revealed that he had not been out of Equatoria Province and the source of infection is unknown.

BACILLARY DYSENTERY.

It will be seen from the summary that the V.W.Z. types of Flexner accounted for the greatest proportion of cases while 6 strains of the 88-Newcastle-Manchester group were isolated. Of Boyd's types, P 274 (4) and 111 (1) were encountered; it is interesting to note 4 strains of P 274 were also isolated in 1940 (Report) suggesting that this organism is responsible for a small but regular percentage of clinical dysentery in the Sudan. During the latter part of the year trials were commenced with Leifson's desoxycholate agar medium (J. Path. and Bact. 1935. Vol. 40 p. 581) in parallel with McConkey's. Although comparatively few cases of dysentery were available the results are definitely in favour of the former medium.

FOOD EXAMINATIONS.

At the request of the military authorities, the Laboratories have undertaken all routine bacteriological examinations of food stuffs. These included 48 different categories involving many hundreds of samples and while the majority have been canned foods, numbers of specimens of flour, sugar and other bulk commodities were also examined.

It is reassuring to note that the great majority of cans have been sterile, indicating first class processing. Blown cans of fruits, especially red varieties, and other acid products such as tomatoes are commonly encountered but have been invariably found to be sterile, the condition being an "acid swell" due to the action of the organic acids on the tin plate with the production of hydrogen. As might be expected the velocity of the reaction is considerably accelerated at the high air temperatures of the Sudan while the catalytic action of the red soluble pigments of red fruits is well known. The practical implication is, that all such cans of blown fruit could be safely passed for use.

An organism of the genus *Bacillus* which appears to be a new species has been isolated from cans of bacon. There was a complete absence of gas, the spoilage being of the "flat sour" type with a most unpleasant smell and partial liquefaction of the fat.

YELLOW FEVER.

1. Research connected with yellow fever has been directed principally to working through the material collected in the field last year during the epidemic in the Nuba Mountains. The results have enabled a very complete account of this epidemic to be written (KIRK Ann. Trop. Med. and Parasitol. 1941 Vol. 35, No. 1).

2. Particularly interesting data were obtained from the supposed focus of Tagoi where the disease appeared to persist after the rest of the epidemic had died down, and where *Aedes aegypti* was found to be abundant and the only mosquito present. However liver sections from fatal cases were quite unlike yellow fever, and a further field investigation proved that the disease in Tagoi was louse borne relapsing fever. Moreover an immunity survey of the Tagoi population, including recovered cases, failed to reveal any sera showing positive mouse protection tests, thus indicating that there had been no yellow fever in Tagoi. The incident is of such unique interest from several aspects that it is intended to publish separately a full account of this epidemic and the circumstances in which it occurred.

3. During the yellow fever epidemic in the Nuba Mountains an epidemic of obscure jaundice (Report 1935) occurred in El Obeid, which was diagnosed as such at the time. Examination of material collected at that time has since verified the diagnosis and provided some interesting data about the disease, without, however, throwing any further light on the vexed question of its aetiology.

4. In collaboration with Dr. A. F. Mahaffy an experimental study of the two strains of yellow fever virus isolated in the Nuba Mountains has been carried out in the Yellow Fever Research Institute, Entebbe. A detailed account of this work is in press, but it may be stated here that these two strains—the first to be identified in Central or East Africa—have not as yet shown that they differ in any essential way from the yellow fever viruses isolated in West Africa or South America.

5. Entomological surveys have been continued uninterruptedly throughout the year in the Nuba Mountains. On the assumption that the insect fauna of 1941 is likely to be similar to that of 1940, it was hoped that this would complete the entomological data referring to the epidemic. The results indicate that *Aedes aegypti* was probably of minor importance only. The following species known to be laboratory transmitters were found in the area, viz. *A. aegypti*, *A. vittatus*, *A. simpsoni* and *Taeniorhynchus africanus*, and among others two suspected species *Aedes furcifer* and *Aedes metallicus* which have not previously been tested in the laboratory.

These two species were tested in the laboratory in Entebbe, together with the pale form of *Aedes aegypti* (var *queenlandensis*) to which reference has been made in previous reports. All three were found to be efficient transmitters of yellow fever in the laboratory, and a detailed account of the experiments has been published (Ann. Trop. Med. Parasitol. in press.). A general review of the subject is given in the Medical Entomologist's report and it will be seen that the evidence points to *A. vittatus* and *A. furcifer* as the principal vectors during the epidemic.

6. Further immunity surveys have been undertaken during this year to define more precisely the borders of the endemic area. This work is still in progress.

ACUTE INFECTIVE HEPATITIS—(EPIDEMIC JAUNDICE).

The outbreak at El Obeid has been mentioned above and in addition specimens from a number of sporadic cases in the Sudan were examined during the year. Also, at the request of the D.D.M.S., Headquarters Troops in the Sudan, the writer investigated an epidemic in certain British units in Asmara shortly after its occupation. In general it closely resembled similar outbreaks described elsewhere, the main points of interest being the occurrence of a considerable number of cases in one unit and a history of an initial mild tonsillitis or naso-pharyngeal catarrh in many cases indicating the possibility of a droplet infection as suggested by several workers. It was impossible to determine the incubation period. A careful investigation failed to reveal any insect vector, and it was possible to exclude Relapsing Fever, Malaria and Leptospirosis. As it was important to rule out Yellow Fever, a number of sera taken during convalescence were examined in Entebbe. All gave negative mouse protection tests.

VACCINIA.

Routine vaccine lymph—Sheep are now the sole vaccinifers used, the method of preparation being that stated in the 1940 Report. 1,115 gms. of pulp were obtained from 26 sheep giving an average of 44.4 gms. per sheep. 350,000 doses of vaccine lymph were issued.

Research. In co-operation with Dr. E. C. Smith, Deputy Director, Laboratory Services, Lagos, a series of experiments was carried out in an attempt to fix neurovaccinia in sheep. The strain had been fixed in mice by repeated brain passage and preliminary experiments by Dr. Smith indicated that it had several advantages, specially in its relative "heat resistance" over vaccine lymph, while proving equally effective in human vaccination. But for mass production for the latter purpose some larger animal was essential and as sheep are such excellent vaccinifers for vaccine lymph it was thought possible that they might prove equally susceptible to a fixed virus.

It was found however that while the strain could be readily fixed in rabbits, all attempts to passage in sheep either the original mouse strain or the rabbit variant were unsuccessful. Sheep inoculated intracerebrally with these very virulent strains either showed no symptoms or a mild illness from which recovery was complete and a subsequent strong or complete immunity to vaccinia when tested by scarification.

Judged from the absence of any references in the literature no previous work appears to have been carried out on this problem and as it was thought that the results might be of interest to other workers, a combined paper has been published (*Jl. of Hygiene*—in press).

SUMMARY OF ROUTINE EXAMINATIONS.

[illegible]

Summary of Faeces Examinations.

<i>B. dysenteriae</i> Flexner	V, W, Z types	...	...	...	...	...	...	100
"	"	" 88--Newcastle-Manchester group	...	...	...	...	...	6
"	"	Type 111	...	...	...	...	...	1
"	"	" P 274	...	...	...	...	...	4
"	Sonne	...	...	...	...	...	...	7
<i>B. Shiga</i>	...	...	...	...	...	...	...	18
<i>B. ambiguum</i> (Schmitz)	...	...	...	...	...	...	...	8
<i>B. typhosum</i>	...	...	...	...	...	...	...	66
<i>Amoeba histolytica</i>	present	...	...	...	...	...	...	17
Ova present	...	...	...	...	...	...	...	54
Negative	...	...	...	...	...	...	...	3,888

Summary of Urine Examinations (Cultures).

<i>B. typhosum</i> isolated	...	...	...	...	...	...	...	73
Negative	...	...	...	...	...	...	...	2,587

Summary of Blood Films for Parasites.

Malaria :—Benign Tertian	...	...	...	...	...	...	...	9
Subtertian	...	...	...	...	...	...	...	73
Quartan	...	...	...	...	...	...	...	4
Relapsing Fever	...	...	...	...	...	...	...	1
Negative	...	...	...	...	...	...	...	490

Summary of Widal Reactions.

<i>B. typhosum</i>	...	...	...	...	...	...	...	321
<i>B. paratyphosum A</i>	...	...	...	...	...	...	...	3
<i>B. paratyphosum B</i>	...	...	...	...	...	...	...	1
<i>Br. melitensis</i>	...	...	...	...	...	...	...	50
Negative	...	...	...	...	...	...	...	1,463

Summary of Blood Cultures.

<i>B. typhosum</i> isolated	...	...	...	...	...	...	...	118
<i>B. paratyphosum A</i> isolated	...	...	...	...	...	...	...	11
<i>Br. melitensis</i>	...	...	...	...	...	...	...	6
<i>Strep. pyogenes</i>	...	...	...	...	...	...	...	8
Other organisms	...	...	...	...	...	...	...	18
Negative	...	...	...	...	...	...	...	780

Vaccines Issued during the Year.

Cholera	...	...	...	...	...	...	...	11,250 c.c.
Anti-Rabic	...	...	...	...	...	...	...	62,075 c.c.
T.A.B.	...	...	...	...	...	...	...	83,750 c.c.
Staph. Aureus	...	...	...	...	...	...	...	925 c.c.
Vaccine Lymph	...	...	...	...	...	...	...	350,000 doses.
T.A.B. Endotoxoid	...	...	...	...	...	...	...	4,950 c.c.

REPORT ON MEDICAL ENTOMOLOGY FOR 1941.

MOSQUITOES IN RELATION TO MALARIA.

Anopheles gambiae.

In order to facilitate the timing of oiling and dusting against larvae in the Gezira experiments were carried out on the duration of the early stages of *A. gambiae* at different seasons. Fresh eggs were placed in a net supported by floats in a pool 5 metres long, 2 metres wide and about $\frac{1}{2}$ metre deep. The escape of adults at night was prevented by a cover of mosquito netting. The insects were examined every morning at 8 a.m. The results are shown below, all periods being given as if hatching, pupation and emergence had occurred at midnight.

Date of hatching	Minimum periods in days				Air temp. °C			Water temp °C		
	Egg	Larva	Pupa	Larva and pupa	Mean max	Mean min.	X "Mean"	Mean max.	Mean min.	X "Mean"
22. 8	1	6	1	7	33.5	21.8	27.7	34.4	24.5	29.5
2. 9	1	5	1	6	36.1	22.2	29.2	36.5	24.6	30.6
21. 9	1	5	1	6	38.2	22.9	30.6	37.2	25.1	31.2
9.10	1	6	2	8	38.5	22.5	30.5	36.5	23.8	30.2
2.11	1	5	1	6	39.4	23.1	31.3	35.0	22.8	28.9
19.11	2	9	2	11	35.3	14.3	24.8	29.4	17.0	23.2
22.12	3	13	4	17	31.7	12.1	21.9	25.7	14.1	19.9

X Max. + min.

2

Owing to the high temperatures at the end of the rains development is then very rapid, more so than has been recorded in other countries. In the cold weather of December it takes nearly three times as long.

In May specimens of *A. gambiae* from Ashkeit, about eight miles north of Wadi Halfa, were received from the Medical Inspector. This record is of considerable interest because the most northerly record of the species was formerly from Zeidab. *A. gambiae* is unknown in Egypt.

Other Species.

A. rufipes was found to be the chief house-haunting mosquito at Rahad in the winter.

Mosquito-eating fish.

Stocks of *Gambusia* were sent to El Obeid, Rahad and the Nuba Mountains. In the latter area a permanent pool at Mongwo, near Abri, was stocked.

The Medical Entomologist, Kenya, kindly supplied a number of the "Barbadoes Millions," *Lebistes reticulatus*, which were taken from Nairobi to the Sudan.

Several hundred fish, *Cyprinodon dispar*, were obtained from the Khor Arbaat, near Port Sudan, but many died of disease. Although the stock still exists after 8 months the species does not multiply readily in pools at Wad Medani.

Surveys.

Work was continued at Khartoum and in the Gezira and White Nile reservoir areas.

MOSQUITOES IN RELATION TO YELLOW FEVER.

The Nuba Mountains.

A mosquito survey was made during the rains with the object of finding out what species were abundant at the season of the outbreak of the 1940 yellow fever epidemic. The following list shows the species caught while biting during a 15 day period in June and July.

S P E C I E S	Near hills at night	Away from hills at night	Out- doors by day	In- doors	TOTAL	Per- cent.
<i>Aedes acatophagoides</i> Theo. ...	0	1	0	0	1	0.1
„ <i>aegypti</i> Linn. ...	9	7	1	6	23	1.7
„ <i>simpsoni</i> var. <i>lilii</i> Theo ...	2	0	0	0	2	0.2
„ <i>metallicus</i> Edw. ...	12	88	2	1	103	7.7
„ <i>luteocephalus</i> Newst. ...	92	2	0	0	94	7.1
„ <i>vittatus</i> Bigot. ...	291	151	14	0	456	34.2
„ <i>alboventralis</i> Theo. ...	0	1	0	0	1	0.1
„ <i>hirsutus</i> Theo. ...	0	4	0	0	4	0.3
„ <i>ochraceus</i> Theo. ...	0	1	0	0	1	0.1
<i>taylori</i> dw & <i>furcifer</i> Edw. ...	473	164	1	2	640	48.0
Other mosquitoes, 4 spp., 1 var. ...	4	3	0	1	8	0.7
TOTAL ...	883	422	18	10	1,333	100

The predominance of *A. furcifer* and *A. vittatus* and the relative scarcity of *A. egypti* are apparent.

Transmission experiments.

At the invitation of the Director of the Yellow Fever Research Institute at Entebbe, the Medical Entomologist visited the Institute, taking living specimens of *Aedes taylori* and *furcifer*, *A. metallicus* and *A. egypti* var. *queenslandensis*. Subsequent experiments showed that all three could transmit yellow fever virus by bite.

The chief implication of these results is that adequate control of potential mosquito vectors of yellow fever is difficult, but not impossible, in wooded areas where *A. taylori* and *furcifer* is abundant near houses. *A. metallicus* and *A. egypti* var. *queenslandensis* should be kept under control by the methods already in force.

Potential mosquito vectors in the Sudan.

Mosquitoes which must be considered are as follows.

(a) Mosquitoes which are known to be able to transmit the virus by bite. *Aedes aegypti* L., *A. egypti* var. *queenslandensis* Theo., *A. simpsoni* var. *lilii* Theo., *A. metallicus* Edw., *A. africanus* Theo., (recently obtained in Equatoria by Dr. H. D. Fairman), *A. luteocephalus* Newst., *A. vittatus* Bigot., *A. stokesi* Evans, *A. taylori* Edw., *Eretmopodites chrysogaster* Graham, *Taeniorhynchus africanus* Theo. and *Culex fatigans* W.

(b) Mosquitoes which can retain the virus but are apparently unable to transmit it by bite. *T. uniformis* Theo.

(c) Common biting species of which the possible relation to yellow fever virus is unknown. *A. gambiae* is not in this category.

Mosquito control.

The Medical Entomologist has supervised the work of the Anti-Aedes Unit. This unit, formed during the year, has visited many parts of the Sudan, checking survey work and assisting in control.

It was found that in several areas war-time conditions, by increasing the demand for water, tend to increase the breeding of *A. aegypti*.

Public Health staff from different parts of the country came to Wad Medani for instruction in Aedes control.

Gambusia were placed in tebeldi tree-water-holes near Nahud. *A. metallicus* breeds in these artificial holes and is common enough to have received a name. Abu Ki'an, from the residents.

OTHER INSECTS.

Sandflies.

Work was continued.

Horse flies.

Tabanus gratus was observed to bite man rarely.

House flies.

Cotton seed, used as fuel, required special attention as it bred flies when wet

Flies in pit latrines.

Chrysomya putoria, a green blow fly, was found to be breeding in enormous numbers in trench and pit latrines in many parts of the country south of Khartoum. Control of the larvae is difficult because they breed readily in deep dark pits with solid or semi-liquid contents and the use of heat (as in China, against *C. megacephala*), kerosene and pyrethrum sprays were found to be impracticable. The following table shows the effect of heat on larvae. They were examined 12 hours after exposure.

Temp. °C	5 min. exposure		10 min. exposure	
	No. of Larvae	Per cent Killed	No. of larvae	Per cent. Killed
49	57	100	82	100
48	75	41	116	95
47	109	18	63	56

Adults were trapped in large numbers with a meat-baited trap described by Froggatt (1922, Farmer's Bull. No. 144 Dept. of Agric. N.S.W.)

Tsetse flies.

The Medical Entomologist visited the control areas of *Glossina palpalis* in December.

Inquiries.

Collections of insects for determination, received during the year, numbered 196.

REPORT ON THE WELLCOME CHEMICAL LABORATORIES FOR THE YEAR 1941.

The re-establishment of the Laboratories in their temporary quarters in Shambat was completed early in the year and normal work was resumed, though under the difficulties resulting from lack of adequate working space and dispersion of staff between two buildings a mile apart.

The number of samples received from the various Government Departments and private firms was 886 as compared with 2,115 in 1940, the reduction in number being due entirely to the handing over of the examination of cotton plant powders for the Plant Physiologist to the Soil Chemist. The samples received were of similar nature to those examined in 1939, and are classified as follows, the figures for both year being given for comparison :—

	1941	1940
Waters	181	264
Foodstuffs	269	168
Medicolegal and Miscellaneous Drugs	58	89
Mineralogical	150	82
Miscellaneous	229	283
Cotton Plant Powders	—	1229

A number of samples directly associated with military activities were submitted and work on several investigations of military and economic importance has been continued.

WATERS.

One hundred and thirty of the samples received were classed as potable watera. They included samples from the Khartoum, Tokar and El Obeid supplies and a considerable number from the various military camps dotted around the country.

FOODSTUFFS.

The examination of foodstuffs has constituted an important part of the work of the year. Samples received include butters, sugars, dates, army rations, native foods, etc.; milks in connection with the control of the Khartoum district and Atbara milk supplies, and various alcoholic beverages.

MEDICOLEGAL AND MISCELLANEOUS DRUGS.

Ten pathological specimens, associated with four separate cases of suspected poisoning were examined. Positive findings were quinine and hyoscine (two cases).

Twenty specimens, classified as toxicological, were received in connection with the above and other cases. Amongst these the only positive findings were hyoscine and aluminium sulphate.

Twenty eight samples of miscellaneous drugs were also received for examination.

MINERALOGICAL.

Under this heading are included coals examined for the Railways, mineral oils, various metals, paints and paint ingredients, etc.

MISCELLANEOUS.

Seventy four samples of oil seeds and various grains and 64 methylated spirits constitute the bulk of this category. Other samples include damaged bombs, scaps, spoilage, oxygen etc.

INVESTIGATIONS.

Important progress has been made in the investigation of the possibilities of the large scale production of medicinal sulphates from sea water. It remains only to prove that the products of evaporation at Port Sudan are essentially the same as in Khartoum for a scheme of production to be put into operation if and when required. Work has been handicapped by the difficulty of finding time to visit Port Sudan to carry out the necessary experiments

Considerable time has been devoted to an extension of the method, developed last year, of camouflaging tents. Extract of sunt bark is now being produced on a large scale in the form of a dry powder readily suitable for transport to any part of the Sudan—or elsewhere if required.

Another investigation, likely to assume considerable importance, concerns the production of wood spirit in association with the production, already commenced by the Chief Conservator of Forests, of wood tar for treating and as a bonding material in the briquetting of charcoal.

PROGRESS OF WORK.

CURATIVE MEDICINE.

The following figures show the number of inpatients, outpatients attendances, and operations performed during the last twelve years :—

YEAR.	Inpatients.	Outpatient Attendances.	Operations Performed.
1931	59,736	4,044,439	6,798
1932	59,642	4,264,412	7,287
1933	70,315	5,092,999	8,609
1934	85,990	6,039,197	10,082
1935	89,093	6,112,303	11,124
1936	96,081	6,500,441	11,229
1937	101,088	6,675,989	12,063
1938	104,366	6,989,990	11,439
1939	105,103	7,119,973	11,253
1940	104,422	6,649,335	11,139
1941	103,023	6,330,711	10,417

The hospital and dispensary work had to be maintained on a care and maintenance basis owing to the shortage of civil medical staff and the necessity of conserving supplies. The organisation as a whole has stood up well to the strain imposed by the war and it is hoped that more supervision in rural districts will now be possible. At any one time during the year many hundreds of military cases were under treatment at civil hospitals.

PREVENTIVE MEDICINE.

This branch is so important to the war effort that it must progress even during war. It says much for the efficiency of the organisation that public health was maintained at such a high level. The training of subordinate public health staff continued without interruption. The development of the Graphic Museum has continued in spite of the war, and it is serving a most useful purpose for both the civil and the military health organisations. The school medical and dental services were maintained as usual.

RESEARCH.

Investigations were continued on Yellow Fever with special reference to the mosquito vector, and on Kala Azar. The Stack Laboratories carried out an enormous amount of routine work for the Army and Royal Air Force which limited the time available for research.

TRAINING.

Courses were held for the training of the following categories of staff :—

<i>Hospitals.</i>	<i>Public Health.</i>	<i>Laboratories.</i>
Medical Officer	Public Health Officers	Laboratory attendants.
Dispensers	Sanitary overseers	
Asst. Radiographers	House to house inspectors	
Medical Assistants	Mosquito men	
Hospital orderlies	Midwives	
Female nurses		

It was impossible to organise any post graduate courses during the year.

DISPENSERS.

3 students were under training throughout the year. In December they sat for the examination in Chemistry and 2 passed, one being referred for a further 6 months training.

ASST. RADIOGRAPHERS.

1 was under training during the year, and passed out successfully.

MEDICAL ASSISTANTS.

9 completed their one year of special training in Omdurman Hospital and were posted to dispensaries. A new class of ten was then enrolled.

PUBLIC HEALTH OFFICERS. See page 17.

SANITARY OVERSEERS. See page 17.

KITCHENER SCHOOL OF MEDICINE.

ANNUAL REPORT 1941.

GENERAL.

The Course of Medical Studies is now $1\frac{1}{2}$ years in the School of Science and $4\frac{1}{2}$ years in the School of Medicine.

NUMBER OF MEDICAL STUDENTS.

At the School of Science.

Class B January to May	9 Students.
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At the School of Medicine,

Class B September to December	9 Students.
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Class A January to December	5 Students.
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Clinical Class January to December	7 Students.
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PROGRESS OF CLASSES.

Examinations were held in :

School of Science. Biology, Chemistry and Physics.

School of Medicine. Organic Chemistry, Pathology and Public Health.

SCHOOL OF SCIENCE EXAMINATION.

Nine candidates presented themselves, and reached the required standard of the School of Science. They were interviewed by the Selection Committee and were admitted to the School of Medicine.

SCHOOL OF MEDICINE EXAMINATIONS.

Organic Chemistry,

Nine candidates were examined in Organic Chemistry and reached the required standard. Dr. A. J. Henry, PH.D., was the examiner.

Final Examination Part I—Pathology and Public Health.

Final Examinations in Pathology and Public Health were held in December, 1941 after permission had been granted by the Colleges to proceed without a Visitor from them. The School was fortunate in obtaining the services of Col. J. S. K. Boyd, D.T.H., and Col. A. E. Richmond, O.B.E., D.P.H., who consented in examining in Pathology and Public Health respectively. Kaim. C. E. G. Beveridge Bey was the internal examiner in Public Health.

Seven candidates presented themselves for this examination. Five reached the required standard in Pathology and six in Public Health.

The Jackson Prize in Pathology was awarded to Mahmud Hussein Mahmud.

The Balfour Prize in Public Health was awarded to Mekki El Sheikh.

Special Final Examination in Surgery.

This examination was held in April, 1941 for the Student Ali Omar. He was successful and recommended for the diploma to practise Medicine in the Sudan. The examiner was Kaim. F. Bartholomew Bey F.R.C.S.E.

POST GRADUATE COURSE.

No Post Graduate Course was held during the year.

TEACHING STAFF.

Kaim. A. E. Lorenzen Bey retired on his transfer from Khartoum and Kaim. C.E.G. Beveridge Bey was elected as Lecturer in Forensic Medicine.

LIBRARY.

Sixty new books were added to the library which now contains 1,400 volumes. During the year 405 books were borrowed by army and civil practitioners and students.

STUDENTS' HOSTEL.

A new drainage system has been constructed in the hostel for waste water. The hostel remains an unsatisfactory building for the 32 students housed there.

HEALTH.

No serious disease was encountered during the year but at the annual medical examination it was noted that there had been a loss of weight amongst the students.

GAMES.

Tennis, football and netball are played in the School grounds. Tennis is the most popular.

MISSIONS.

The following table shows the work carried out by Medical Missions :—

			Inpatients.	Outpatient Attendances	Operations.
THE CHURCH MISSIONARY SOCIETY.					
Omdurman. (Khartoum Province)	....	....	1,365	60,187	623
Lui (Equatoria Province)	....	....	465	19,320	155
Salara (Nuba Mountains)	....	....	337	31,706	6
Katcha (Nuba Mountains)	....	....	612	4,386	-
Zeraf Island (Upper Nile)	....	....	-	13,935	243
THE SUDAN UNITED MISSION.					
Abri ....	....	....	75	4,285	---
Eastern Jebels (Kordofan)					
Rom (Upper Nile Province)	....	....	12	2,948	2
THE AMERICAN MISSION.					
Nasir (Upper Nile Province)	....	....	7	8,542	---
Doleib Hill (Upper Nile Province)	....	....	75	27,341	---
THE SUDAN INTERIOR MISSION.					
Melut	...	...	-	507	---
Abaiyat	...	...	-	982	---

S T A F F .

SUDAN MEDICAL SERVICE 1941.

APPROVED BUDGETARY ESTABLISHMENT OF CLASSIFIED OFFICIALS.

Appointment.	Establishment
Headquarters.	
Director	1
Assistant Director (Public Health)	1
Assistant Director (Hospitals)	1
Head Staff Clerk	1
Staff Clerk	1
Clerks	21
Head Accountant	1
Accountant	1
Book-keepers	13
Head Storekeeper	1
A/Head Storekeeper	1
Storekeepers... ..	9
Hospitals.	
Senior Physician	1
Senior Surgeon	1
Gynaecologist	1
Ophthalmologist	1
Senior Medical Inspectors	32
Assistant Ophthalmologist	1
Medical Sub-Inspectors	7
Medical Officers	66
Medical Assistants	298
Matron	1
Matron, Nurses Training School	1
Charge Sisters	6
Nursing Sisters	9
Radiographer	1
Assistant Radiographers	6
Pharmacists	2
Dispensers	4
Dispensers under training	4
Bookkeepers... ..	54
Clerks	3
Southern Storekeeper	1
Head Hospital Orderlies	29
Theatre Attendants	22
<i>Brought forward</i>	603

Appointment							Establishment
<i>Carried forward</i>							603
Public Health.							
Medical Officer of Health	...	...	...	...	...	...	1
Assistant Medical Officer of Health	...	...	...	...	...	...	1
Chief Public Health Inspector	...	...	...	...	...	...	1
Senior Public Health Inspectors...	...	...	...	...	...	...	10
Public Health Officers	...	...	...	...	...	...	15
Public Health Overseers	...	...	...	...	...	...	90
Principal, Midwives Training School	...	...	...	...	...	...	1
Charge Sister	...	...	...	...	...	...	1
Staff Midwives	...	...	...	...	...	...	2
Staff Nurse	...	...	...	...	...	...	1
Research.							
Stack Medical Research Laboratories.							
Assistant Director (Research) and Senior Medical Research Officer	...	...	...	...	...	...	1
Bacteriologist	...	...	...	...	...	...	1
Assistant Bacteriologist	...	...	...	...	...	...	1
Laboratory Assistants (British)	...	...	...	...	...	...	4
Laboratory Assistants (Sudanese)	...	...	...	...	...	...	35
Junior Technical Assistants	...	...	...	...	...	...	2
Clerks	...	...	...	...	...	...	3
Medical Entomology.							
Medical Entomologist	...	...	...	...	...	...	1
Technical Assistants	...	...	...	...	...	...	2
Wellcome Chemical Laboratories.							
Government Analyst	...	...	...	...	...	...	1
Chemists	...	...	...	...	...	...	2
Technical Assistants	...	...	...	...	...	...	5
Junior Technical Assistants	...	...	...	...	...	...	2
Clerk	...	...	...	...	...	...	1
Kitchener School of Medicine.							
Registrar	...	...	...	...	...	...	1
Library Clerk	...	...	...	...	...	...	1
Graphic Museum.							
Assistant Curator	...	...	...	...	...	...	1
Museum Attendants	...	...	...	...	...	...	2
TOTAL							792

FINANCIAL.

The following figures show the actual Revenue and Expenditure of the Sudan Medical Service for the last three years :—

	1939	1940	1941
	£E.	£E.	£E.
1. Revenue	41,954	42,210	79,180
2. Expenditure :			
Chapter 1. Personnel and Personal Allowances	175,562	174,335	167,329
Chapter 2. Services	106,382	90,910	129,108
Chapter 3. Extraordinary Expenditure	3,787	1,839	3,135
TOTAL	283,630	285,731	299,572

285,731 267,084

TABLE I.
ADMISSIONS AND DEATHS.
BY DISEASES.

	DARFUR		EQUATORIA		GEZIRA		KASSALA		KHARTOUM		KORDOFAN		NORTHERN		UPPER NILE		TOTAL	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
1. T. B. Pulmonary ...	12	7	102	23	121	21	71	9	124	21	73	21	104	5	24	3	631	110
2. T. B. Non-Pulmonary ...	18	1	43	2	90	2	28	1	175	7	71	7	70	1	16	1	511	22
3. Syphilis ...	4,338	7	3,946	2	1,012	3	235	—	250	—	4,211	11	501	1	971	2	15,464	26
4. Gonorrhoea ...	240	1	739	1	618	2	397	1	120	—	595	1	343	—	358	1	3,410	7
5. Soft Sore ...	71	—	45	—	65	—	77	—	35	—	88	1	38	—	23	1	442	2
6. Trachoma ...	105	—	22	—	68	—	38	—	58	—	184	—	87	—	14	—	575	—
7. All other eye diseases ...	156	—	534	—	234	3	109	—	716	—	594	—	528	—	329	—	3,200	3
8. Ear ...	84	—	146	2	75	1	26	1	36	2	78	3	47	—	8	—	560	9
9. Skin ...	172	8	616	1	136	—	54	—	89	2	489	—	91	1	50	1	1,697	13
10. Wounds and other injuries ...	2,021	20	4,547	64	3,034	54	1,722	25	1,089	33	3,581	48	1,285	14	822	5	18,101	263
11. Tumours Malignant ...	12	5	28	13	34	9	9	1	92	7	61	11	13	3	6	3	255	52
12. Tumours Non-Malignant ...	10	—	61	—	34	—	12	—	119	1	76	2	13	1	—	—	325	4
13. Gynaecological ...	22	—	54	1	261	3	108	1	338	2	133	1	104	—	23	—	1,043	8
14. Confinements ...	34	—	89	6	142	14	35	4	407	3	61	1	45	3	14	1	827	32
15. Poisoning ...	20	1	26	2	35	6	24	4	8	1	7	3	8	—	—	—	128	17
16. Ancylostomiasis ...	17	—	1,475	10	29	3	9	—	22	—	9	—	39	1	105	7	1,705	21
17. Bilharziasis ...	40	—	533	7	197	5	11	—	31	—	255	—	96	—	72	2	1,235	14
18. Blackwater Fever ...	—	—	14	3	3	2	—	—	4	1	3	—	1	—	3	1	28	9
19. Dysentery, Amoebic ...	406	6	193	3	725	25	441	19	203	7	614	25	174	1	168	7	2,924	93
20. Dysentery, Bacillary ...	202	6	36	2	39	5	317	6	42	2	76	6	21	1	4	2	737	30
21. Filariasis ...	8	—	38	—	4	—	9	—	—	—	2	—	1	—	—	—	62	—
22. Madura disease ...	19	—	126	—	122	—	22	—	67	—	24	—	44	—	—	—	424	—
23. Malaria ...	318	2	1,195	10	2,859	14	698	8	704	3	1,703	21	948	2	126	—	8,551	60
24. Leishmaniasis ...	24	1	21	3	234	64	86	25	10	4	56	10	6	4	57	24	494	135
25. Trypanosomiasis ...	1	—	393	5	1	—	—	—	6	1	—	—	—	—	57	23	458	29
26. Yaws ...	1	—	1,746	—	—	—	—	—	3	—	—	—	—	—	36	—	1,786	—
27. Heat Stroke ...	1	—	1	—	—	—	70	5	—	—	13	1	9	—	5	—	99	6
28. Guinea Worm ...	10	—	1,209	1	50	—	5	—	1	—	168	—	18	—	61	—	1,522	1
29. Tropical Ulcer ...	241	—	3,634	9	257	1	51	2	11	—	865	—	4	—	127	1	5,190	13
30. Anthrax ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
31. Cerebrospinal Meningitis ...	5	2	97	10	35	9	10	5	14	2	57	21	44	18	19	4	281	71
32. Chickenpox ...	162	—	36	—	241	—	86	—	129	—	389	—	83	—	2	—	1,128	—
33. Dengue ...	—	—	2	—	—	—	5	—	—	—	—	—	—	—	—	—	7	—
34. Diphtheria ...	3	1	—	—	38	18	8	1	81	13	42	3	13	2	1	—	186	38
35. Enteric Fever ...	11	1	21	4	13	3	6	—	106	8	17	2	34	9	27	1	235	28
36. Erysipelas ...	—	—	2	—	3	1	2	1	2	—	—	—	—	—	1	—	10	2
37. Gastro Enteritis of children ...	7	3	3	3	13	4	76	2	129	22	25	7	5	2	4	—	262	43
38. Influenza ...	328	6	77	2	64	—	69	—	255	—	104	2	59	—	4	—	960	10
39. Leprosy ...	31	1	27	—	6	—	4	1	5	—	31	1	5	—	2	—	111	3
40. Undulant Fever ...	2	—	7	—	3	1	8	—	2	—	9	2	—	—	—	—	31	3
41. Measles ...	25	—	4	—	53	2	28	—	35	—	159	5	18	—	6	—	328	7
42. Mumps ...	10	—	4	—	8	—	7	—	3	—	47	—	2	—	2	—	83	—
43. Pellagra ...	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1	—
44. Puerperal Fever ...	2	1	—	—	9	3	—	—	15	—	11	1	4	1	—	—	41	6
45. Phlebotomus Fever ...	34	—	—	—	3	—	11	—	1	—	—	—	65	—	—	—	114	—
46. Pneumonia ...	149	40	395	37	422	60	168	25	480	27	157	25	104	14	116	8	1,991	236
47. Rabies ...	4	4	2	2	49	—	4	—	1	—	4	3	—	—	1	1	65	10
48. Relapsing Fever ...	4	1	1	—	316	17	6	—	27	2	28	3	—	—	1	—	383	23
49. Acute Rheumatism ...	64	—	62	—	21	—	75	1	68	—	28	—	22	—	16	—	356	1
50. Smallpox ...	—	—	15	—	—	—	—	—	2	—	—	—	1	—	2	—	20	—
51. Tetanus ...	3	—	3	—	7	2	4	1	4	1	10	8	1	—	2	1	34	13
52. Whooping Cough ...	16	1	18	—	8	—	11	1	16	1	9	2	23	2	—	—	101	7
53. Circulatory System ...	33	8	77	8	180	27	123	13	279	41	175	41	201	10	37	5	1,105	153
54. Respiratory System ...	95	4	663	16	613	16	380	5	345	7	793	46	269	6	197	4	3,355	104
55. Alimentary System ...	309	12	1,252	50	1,049	87	689	25	1,028	38	1,073	70	772	15	594	30	6,766	327
56. Genito-Urinary Sytem ...	113	3	200	4	349	17	183	6	314	19	438	15	230	8	51	3	1,878	75
57. Nervous System ...	17	1	42	1	86	7	54	2	119	4	97	8	58	—	21	2	494	25
58. Scurvy ...	2	—	4	1	21	—	21	—	5	—	24	4	—	—	8	—	85	5
59. Diabetes ...	3	—	1	—	42	—	13	1	64	—	13	4	27	2	2	—	165	7
60. Fever of uncertain origin ...	25	3	272	3	425	24	338	5	313	20	172	22	230	9	265	7	2,040	93
61. All other diseases ...	409	5	2,629	19	1,298	37	576	4	957	21	697	18	567	6	949	7	8,082	117
TOTAL ...	10,469	162	27,528	330	15,854	572	7,630	211	9,559	323	18,699	488	7,475	142	5,809	158	103,023	2,386

TABLE II.
OUT-PATIENTS
NEW CASES BY DISEASES
and
TOTAL ATTENDANCES.

	Darfur	Equatoria	Gezira	Kassala	Khartoum	Kordofan	Northern	Upper Nile	Total
1. T. B. Pulmonary	29	54	196	99	153	78	96	11	716
2. T. B. Non-Pulmonary	32	12	57	101	177	97	6	16	498
3. Syphilis	12,765	4,921	11,408	4,997	1,656	20,651	2,220	6,741	65,359
4. Gonorrhoea	2,157	904	2,524	1,890	659	2,374	1,237	846	12,591
5. Soft Sore	378	426	671	595	231	460	12	312	3,085
6. Trachoma	4,502	845	33,996	12,091	1,023	3,855	31,594	494	88,400
7. All other eye diseases	8,253	19,523	56,058	15,776	4,366	25,466	27,196	7,329	163,967
8. Ear	2,141	4,164	11,971	4,745	1,928	4,590	7,321	542	37,402
9. Skin	4,389	12,048	9,930	2,367	1,077	11,442	2,175	519	43,947
10. Wounds and other injuries	32,998	66,742	113,102	79,490	32,175	60,287	41,260	8,930	434,984
11. Tumours Malignant	21	4	2,420	61	71	91	4	—	2,672
12. Tumours Non-Malignant	274	19	1,431	267	113	195	343	281	2,923
13. Gynaecological	29	6	442	42	3,679	303	228	2	4,731
14. Confinements	29	5	35	21	553	65	34	—	742
15. Poisoning	18	116	15	7	20	9	22	—	207
16. Ancylostomiasis	602	4,113	48	30	20	18	55	26	4,912
17. Bilharziasis	1,721	1,422	1,639	177	468	6,153	1,718	39	13,337
18. Blackwater Fever	—	5	—	—	2	2	1	2	12
19. Dysentery, Amoebic	2,128	563	1,854	4,218	617	2,902	2,867	423	15,572
20. Dysentery, Bacillary	—	342	613	515	430	251	310	—	2,461
21. Filariasis	3	78	1	—	—	1	13	—	96
22. Madura disease	7	2	389	17	139	60	3	—	617
23. Malaria	4,576	6,403	35,052	10,434	1,447	26,002	13,771	3,294	100,979
24. Leishmaniasis	16	4	90	—	—	14	—	1	125
25. Trypanosomiasis	—	84	1	—	—	—	—	15	100
26. Yaws	35	15,826	1	—	—	—	—	44	15,906
27. Heat Stroke	14	—	—	—	—	1	—	—	24
28. Guinea Worm	36	2,562	—	7	—	709	—	261	3,740
29. Tropical Ulcer	542	13,632	794	276	21	2,892	4	1,985	20,146
30. Anthrax	1	—	—	—	—	14	—	—	15
31. Cerebrospinal Meningitis	4	7	15	6	7	36	118	15	208
32. Chickenpox	184	40	1,244	82	133	519	315	24	2,541
33. Dengue	—	—	—	—	—	—	—	—	—
34. Diphtheria	4	—	9	4	62	37	1	—	117
35. Enteric Fever	11	—	2	6	30	—	17	1	67
36. Erysipelas	—	—	—	—	1	—	—	—	1
37. Gastro enteritis of children	161	51	1,017	533	1,713	536	343	556	4,910
38. Influenza	1,483	215	1,523	2,473	2,227	456	843	—	9,220
39. Leprosy	32	47	61	7	6	73	80	11	317
40. Undulant Fever	2	1	9	15	1	1	—	—	29
41. Measles	59	3	357	97	28	285	171	—	1,000
42. Mumps	19	15	309	80	4	263	104	2	796
43. Pellagra	—	—	—	1	—	—	—	—	1
44. Puerperal Fever	—	1	4	3	2	23	8	—	41
45. Phlebotomus Fever	18	—	2	67	—	3	11	—	101
46. Pneumonia	121	297	1,669	271	327	148	544	75	3,452
47. Rabies	12	—	14	6	—	3	9	—	44
48. Relapsing Fever	6	—	1,596	22	25	19	60	—	1,728
49. Acute Rheumatism	530	607	2,569	1,080	133	274	2,261	25	7,419
50. Smallpox	—	6	23	—	2	—	—	15	46
51. Tetanus	1	1	—	—	18	6	—	—	26
52. Whooping Cough	242	104	474	156	1,395	354	313	—	3,038
53. Circulatory System	191	116	3,181	867	4,704	958	2,352	362	12,731
54. Respiratory System	8,777	26,967	55,318	21,050	20,722	28,795	21,165	5,116	187,910
55. Alimentary System	15,842	17,356	69,229	28,078	24,093	87,296	36,916	6,471	285,281
56. Genito-Urinary System	1,950	57	3,598	5,243	1,759	3,712	2,996	124	19,439
57. Nervous System	82	9	2,960	1,094	109	759	2,811	41	7,865
58. Scurvy	4	87	163	5	—	34	—	8	301
59. Diabetes	4	60	31	40	24	22	39	—	220
60. Fever of uncertain origin	72	3,312	21,203	5,378	14,127	2,329	11,090	695	58,206
61. All other diseases	9,050	15,160	67,976	18,651	7,831	10,600	32,990	6,033	168,291
Total New Cases	116,557	219,344	519,389	223,557	130,508	306,523	248,047	51,687	1,815,612
ATTENDANCES :									
MEN	176,939	316,834	653,569	353,717	369,374	403,760	300,578	104,844	2,679,615
WOMEN	75,424	142,658	315,501	74,954	226,203	200,030	184,179	43,627	1,262,576
CHILDREN	98,962	153,643	443,433	127,468	127,484	370,533	416,117	55,799	1,793,439
ATTENDANCES :									
DRESSING STATIONS	—	288,174	—	57,545	—	102,651	146,711	—	595,081
Total Attendances	351,325	901,309	1,412,503	613,684	723,061	1,076,974	1,047,585	204,270	6,330,711

